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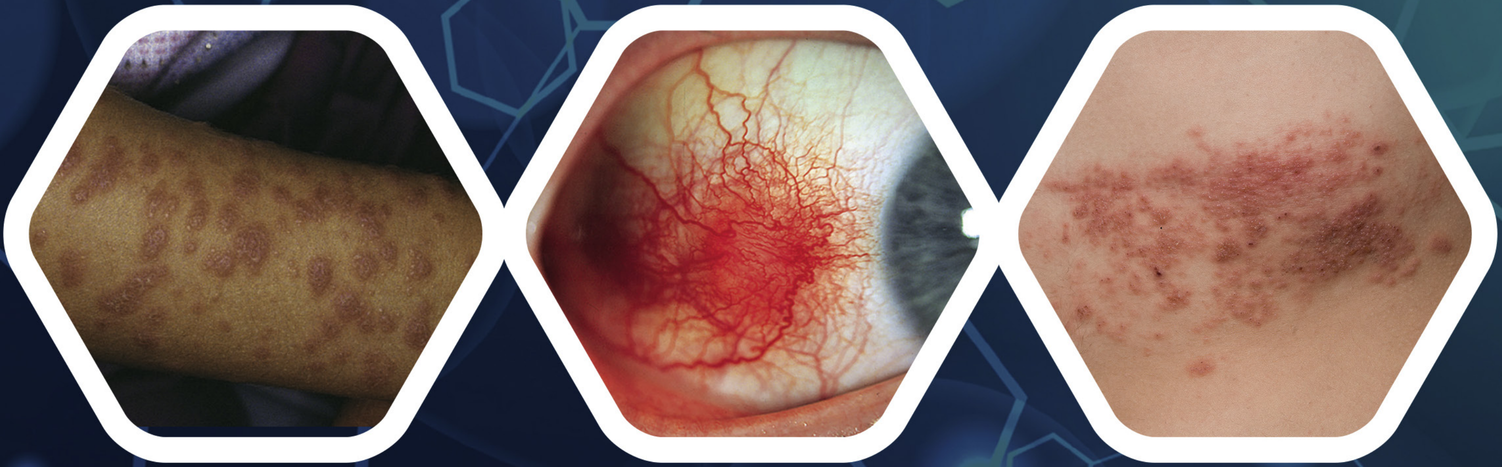
PAUL RUTTER

COMMUNITY PHARMACY

SYMPTOMS, DIAGNOSIS AND TREATMENT



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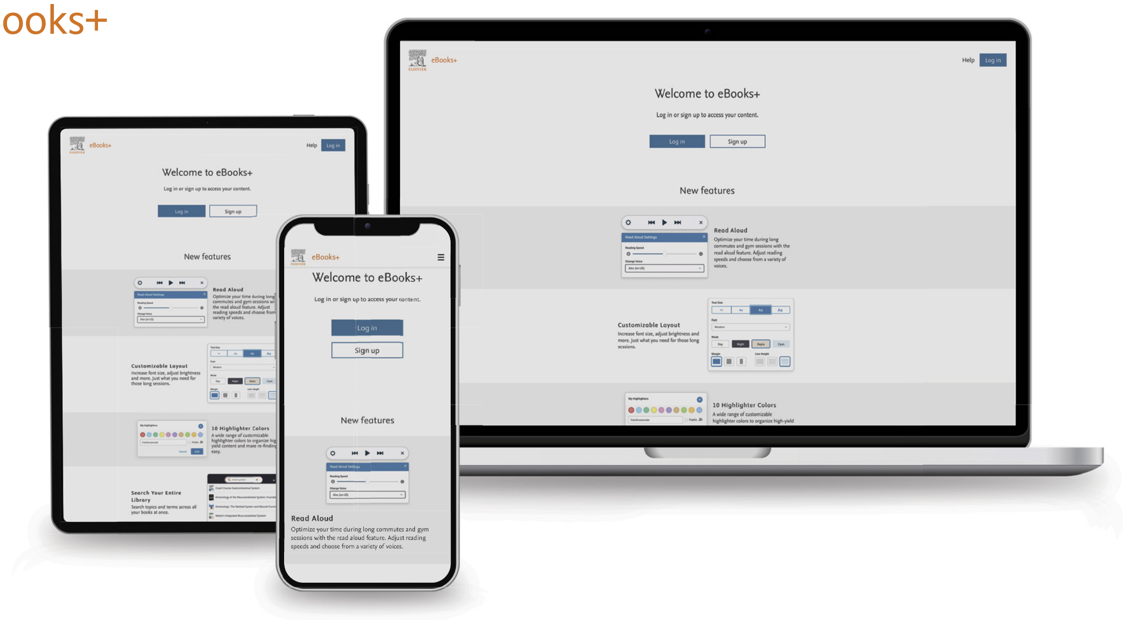

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COMMUNITY PHARMACY

SIXTH EDITION

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SYMPTOMS, DIAGNOSIS AND TREATMENT

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Useful Websites

Evidence-based Medicine

National Institute for Health and Care Excellence	https://www.nice.org.uk
Bandolier	http://www.bandolier.org.uk
Centre for Reviews and Dissemination	https://www.york.ac.uk/crd
Centre for Medicines Optimisation	https://www.centreformedicinesoptimisation.co.uk/mtrac
Regional Drugs and Therapeutic Centre	https://rdtc.nhs.uk

Medicines Information and Regulation

UK Medicines Information	https://www.ukmi.nhs.uk/
Electronic medicines compendium	https://www.medicines.org.uk/emc
NICE Clinical Knowledge Summaries	https://cks.nice.org.uk/#?char=A
Medicines & Healthcare Products Regulatory Agency	https://www.gov.uk/government/organisations/medicines-and-healthcare-products-regulatory-agency
European Medicines Agency	https://www.ema.europa.eu/ema
US Food and Drug Administration	https://www.fda.gov
Therapeutic Goods Administration (Australian)	https://www.tga.gov.au

UK Professional Bodies

Royal Pharmaceutical Society	https://www.rpharms.com
British Medical Association	https://www.bma.org.uk
Royal College of Nursing	https://www.rcn.org.uk
British Dental Association	https://www.bda.org

UK Regulators

General Pharmaceutical Council	https://www.pharmacyregulation.org
General Medical Council	https://www.gmc-uk.org
The Nursing and Midwifery Council	https://www.nmc.org.uk
General Dental Council	https://www.gdc-uk.org
Health and Care Professions Council	https://www.hcpc-uk.org
General Optical Council	https://optical.org

UK Pharmacy Organizations and Trade Bodies

National Pharmaceutical Association	https://www.npa.co.uk
Community Pharmacy England	https://cpe.org.uk
Guild of Healthcare Pharmacists	https://www.ghp.org.uk
UK Clinical Pharmacy Association	https://ukclinicalpharmacy.org
Association of the British Pharmaceutical Industry	https://www.abpi.org.uk
The Proprietary Association of Great Britain	https://www.pagb.co.uk
British Pharmaceutical Students Association	https://www.bpsa.co.uk

International Healthcare Organizations

World Health Organization	https://www.who.int

Pharmacy Journals

Pharmaceutical Journal	https://pharmaceutical-journal.com
Chemist and Druggist	https://www.chemistanddruggist.co.uk
The Pharmacist	https://www.thepharmacist.co.uk
International Journal of Pharmacy Practice	https://onlinelibrary.wiley.com/journal/20427174?journalRedirectCheck=true
International Journal of Clinical Pharmacy	https://link.springer.com/journal/11096
Research in Social and Administrative Pharmacy	https://www.sciencedirect.com/journal/research-in-social-and-administrative-pharmacy

Wider Healthcare Journals of interest to Community Pharmacy

British Journal of General Practice	http://www.bjgp.org
British Medical Journal	https://www.bmj.com
Health Services Research	https://www.hsr.org
Journal of Evaluation in Clinical Practice	https://onlinelibrary.wiley.com/journal/13652753
Journal of SelfCare	https://selfcarejournal.com
The Lancet	https://www.thelancet.com
New England Journal of Medicine	https://www.nejm.org

General Health Sites for Patients

Patient	http://www.patient.co.uk
MyHealthfinder	http://www.healthfinder.gov
BBC News: Health	http://www.bbc.co.uk/health

Preface

Demand on healthcare professionals to deliver high-quality patient care has never been greater. A multitude of factors impinge on healthcare delivery today, including an aging population, more sophisticated medicines, high patient expectation, health service infrastructure and adequate and appropriate staffing levels. In primary care, the medical practitioner role is still central in providing this care, but shifting workload from secondary to primary care is placing greater demands on their time, resulting in new models of service delivery that increasingly involve other allied health professionals.

This is leading to a breaking down of the traditional boundaries of care between doctors, nurses and pharmacists. In particular, certain activities once seen as the responsibility of medical practitioners are now being performed by nurses and pharmacists as their scope of practice expands. The traditional role of supplying medicines safely and efficiently through community pharmacy still exists, but greater patient-facing cognitive roles are now firmly established, for example, in smoking cessation, weight management and vaccination programmes. These are increasingly being included in contractual agreements between government agencies and pharmacy contractors. The year 2019 saw the launch of the community pharmacist consultation service, which was designed to relieve pressure on general practitioner appointments through NHS 111 referrals to pharmacists to manage minor illness. This service was extended in 2020 to include referrals from general practice. National minor ailment schemes are also now in place in Wales, Scotland and England allowing pharmacists to provide prescription-only medicines to patients through patient group directions to further relieve pressure on general practice.

Last, the announcement that all newly qualified pharmacists must register as independent prescribers from 2026 means that the scope of practice of community pharmacists is likely to expand. It will therefore be imperative that pharmacists possess the prerequisite skills to make sound decisions and arrive at diagnoses using clinical reasoning an evidence-based approach to management.

The book is intended for all nonmedically qualified healthcare staff but especially for pharmacists and nurses working in primary care, from undergraduate students to experienced practitioners.

It is hoped that the information contained within the book is both informative and useful.

Introduction

Community pharmacists are the most accessible healthcare professionals. No appointment is needed to consult a pharmacist, and patients can receive free, unbiased advice almost anywhere. A community pharmacist is often the first health professional a patient seeks advice from and as such provides a filtering mechanism whereby patients with minor self-limiting conditions can be appropriately treated with the correct medications and patients with more serious or chronic pathology referred on to appropriate practitioners for further investigation. On a typical day, a pharmacist working in an 'average' community pharmacy can realistically expect to help between 5 and 15 patients a day who present with various symptoms for which they are seeking advice, reassurance, treatment or a combination of all three.

Probably of greatest impact to community pharmacy practice globally is the increased prominence of self-care. Self-care is not new; people have always taken an active role in their own health. Health improvements have been seen in people adopting health-enhancing behaviours rather than just through medical intervention. This has led to self-care being seen in a broader context than just the way in which people deal with everyday illness. In the United Kingdom, the Self Care Forum (http://www.selfcareforum.org) was established whose purpose is to promote self-care and embed it in everyday life.

What is self-care?

Fundamentally, the concept of self-care puts responsibility on individuals for their own health and well-being. The World Health Organization (WHO) defines self-care as 'the ability of individuals, families and communities to promote health, prevent disease, and maintain health and to cope with illness and disability with or without the support of a health-care provider'.

Self-care has been described as a continuum (Fig. 1), starting with individual choices on health (e.g., taking exercise) and moving through to managing their own ill health (e.g., self-medicating) either on their own or with help. As people progress along the continuum, more facilitation by others is required until a person needs fully managed care.

What is self-medication?

Self-medication is just one element of self-care and can be defined as the selection and use of medicines by individuals to treat self-recognized illness or symptoms. How these medicines are made available to the public varies from country to country, but all have been approved by regulatory agencies as safe and effective for people to select and use without the need for medical supervision or intervention. In many countries, regulatory frameworks support reclassification of medicines away from prescription-only control by having a gradation in the level of medicine availability, whereby certain medicines can only be purchased at a pharmacy. These nonprescription medicines usually have to be sold either by a pharmacist or under a pharmacist's supervision. This approach to reclassification has seen a wide range of therapeutic agents made available to consumers, including proton pump inhibitors, orlistat, triptans and beta-2-agonists.

'Facilitated self-medication'

The majority of purchases for nonprescription medicines are by consumers alone using product information from packaging to make informed decisions on whether to purchase them. When consumers seek help at the point of purchase, it can be termed 'facilitated self-medication'. When medicines are purchased through pharmacies, staff are in a strong position to facilitate self-care decision making by consumers because in most pharmacies, transactions take place through trained counter assistants or pharmacists. Limited research has shown that consumer purchasing decisions are affected by this 'facilitation'. Nichol et al., 1992. and Sclar et al., 1996. both demonstrated that consumers (25% and 43%, respectively) altered their purchasing decisions when proactively approached by pharmacy staff. These studies highlight how the pharmacy team are able to positively shape consumer decisions and help guide them to arguably better alternatives.

UK health policy and its effect on pharmacy's contribution to self-care

The catalyst for change in pharmacy services was heralded by the publication of the Nuffield Report in 1986, which recommended 'extended' pharmacy roles in response to concerns over an excessively educated workforce to principally dispense prescriptions. These recommendations were furthered with the publication of the Pharmaceutical Care Report in 1992. It advocated a new model of community pharmacy practice, with the pharmacy acting as a health hub offering a wide range of nondispensing-related services that promoted health and well-being. Subsequent UK policy documents have reflected a need to shift from dispensing to nondispensing services, in particular advocating a role in health promotion,

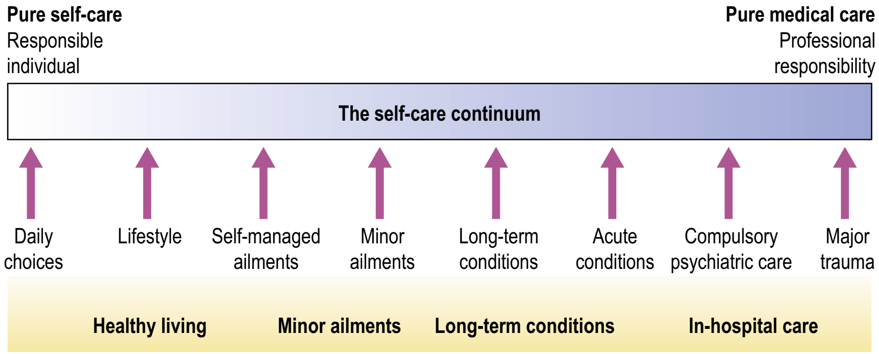

Fig. 1 The self-care continuum.

health prevention and self-care. In 2005, a new community pharmacy contract was introduced and was the start of translating policy into practice by introducing new services and shifting remuneration away from dispensing.

Evolution of the community pharmacy contract

From 2005 to 2019, a number of new versions of the contract were implemented, each successively introducing more nondispensing roles, for example 'minor ailment schemes', 'medicines use review' and 'healthy living pharmacies'. All have required pharmacists to demonstrate a level of competency and achieve some form of accreditation before these services can be offered. The UK regulator has recently updated educational standards, which now require schools of pharmacy to meet certain outcomes related to self-care, although the word 'self-care' is not explicitly used.

English community pharmacy in 2023

In July 2019, the government agreed a 5-year Community Pharmacy Contractual Framework (CPCF) to help fulfil the ambitions of the NHS's long-term plan. The current contract, reflecting years 4 and 5 of the CPCF agreement, adopts a three-tier model of service provision:

- ***Essential services:*** nationally set mandatory services that must be provided
- ***Advanced services:*** nationally set optional services that pharmacies can choose to deliver provided they meet certain minimum requirements
- *Locally commissioned services:* can be contracted via a number of different routes and by different commissioners. Key to local services is to meet a local need. There are many examples of local services, including alcohol screening and brief interventions, minor ailments, sexual health and weight management.

It is clear that many of these services fall under the umbrella of the WHO's definition and align to one or more of the seven pillars of self-care.

Within the essential services, there is specific service specification on self-care, in which the pharmacy is expected to enable people to derive maximum benefit from caring for themselves or their families by providing access, choice and advice to help them self-manage self-limiting or long-term conditions, including promotion of healthy lifestyles and provision of information to facilitate them making appropriate choices. The pharmacy is also obligated to signpost patients to other health and social care providers, when appropriate, and receive self-care referrals from other NHS services and healthcare professionals.

Future self-care opportunities for pharmacy

The CPCF has successfully embedded new nondispensing services into the paid activities of community pharmacy and started to realize the 'health hub' first described in the 1992 Pharmaceutical Report. The newer services have started to integrate pharmacy activity with primary and secondary care, allowing for greater continuity of care for patients through better sharing of information across sectors. The 5-year contractual framework runs out in 2024, and it is currently uncertain what any new agreement will look like. However, in May 2023, the government announced a £645 million investment in community pharmacy over the subsequent 2 years. This investment was part of a wider package of measures to improve access to primary care and empower patients to exercise greater levels of self-care.

For community pharmacy, this additional funding is to support the blood pressure checking and contraceptive services but also to provide a 'pharmacy common conditions service', Pharmacy First, by early 2024. Historically, locally commissioned 'minor illness schemes' have been in place, but a nationally commissioned and funded service has long been called for to bring England in line with Wales and Scotland.

The Pharmacy First service is intended to enable pharmacy to manage more conditions without onward referral to a doctor because a number of prescription-only medicines will be accessible to treat patients with conditions such as impetigo, uncomplicated urinary tract infections and shingles, as well as providing over-the-counter medicines free of charge to eligible patients. It is hoped that this service could free up to 30 million general practitioner appointments each year. These changes are reflected in expanded sections within the book.

In addition to enhanced funding and services, a major change in pharmacy, as a profession, will be that from 2026, all newly qualified pharmacists will also qualify as independent prescribers. Whilst bodies such as NHS England are working on this transition to the workforce being prescribers, and pilot 'pathfinder sites' are exploring logistics of how a pharmacist prescribing workforce might integrate into the NHS, the implications for community pharmacy practice has yet to be clearly articulated. Obviously, this provides opportunity for pharmacists to extend their scope of practice, whether specializing in prescribing in a single therapeutic area or to be more generalist.

The role pharmacists play in facilitating self-care, whether through NHS contractual services or private commercial enterprise, now and in the future only looks set to expand.

A high level of public trust and confidence in pharmacists' ability to advise on nonprescription medicines is afforded to community pharmacists. Although there is a general global move to liberalize nonprescription markets, pharmacies in many countries still are the main supplier of nonprescription medicines. Pharmacists are therefore in a position to facilitate consumer self-care and self-medication, which needs to be built on and exploited.

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Nichol, M. B., McCombs, J. S., Johnson, K. A., Spacapan, S., & Sclar, D. A. (1992). The effects of consultation on over-the-counter medication purchasing decisions. *Medical care*, *30*(11), 989–1003.

Sclar, D. A., Robison, L. M., & Skaer, T. L. (1996). Pharmacy consultation and over-the-counter medication purchasing outcomes. Over-the-Counter Medication Intervention Project Team. *Journal of clinical pharmacy and therapeutics*, *21*(3), 177–184.

Pharmaceutical Care: The future for community pharmacy. (1992). Department of Health/Royal Pharmaceutical Society of Great Britain. *Pharm J.* (Supp).

How to use the book

The book is divided into 13 chapters and supplementary material hosted on Elsevier's electronic portal. The first two chapters discuss how to make a diagnosis and the skills required to make sound decisions when clinical uncertainty exists. They discuss the concept of clinical reasoning, safety netting, what constitutes a good consultation and the importance of involving patients in management plans.

This is followed by 10 system-based chapters structured in the format shown in Fig. 2 and covers subject knowledge needed to a make differential diagnosis based on signs and symptoms experienced by a patient. The final chapter (Chapter 13) reviews a small number of over-the-counter (OTC) products in which a diagnosis does not need to be established but requires input from the pharmacy team to ensure safe and appropriate use of the product and therefore takes a slightly different format to the other chapters.

Key features of each chapter

At the beginning of each chapter, there is a short section addressing basic anatomy and history taking specific to that body system. A basic understanding of the anatomic location of major structures is useful when attempting to diagnose or exclude conditions from a patient's presenting complaint. However, this is not intended to replace an anatomy text, and readers are referred to further reading listed throughout the book for more detailed information on anatomic considerations.

Elements included under each condition

The same structure has been adopted for every condition. This is intended to help readers process the information presented in a consistent manner and adopt the concept of clinical reasoning as discussed in Chapters 1 and 2. To help readers assimilate the information, tables, figures and algorithms are included for many of the conditions.

Arriving at a differential diagnosis

To contextualize hypothesis generation, a table listing the likelihood in which conditions are encountered in primary care is presented. This is designed to frame the questions that should be asked to test these hypotheses based on the most likely cause of symptoms. This is designed to get readers to always be thinking about asking 'the right questions, at the right time, for the right reason'.

To help this process, tables summarizing key questions that should be asked are provided, including the relevance (i.e., the rationale for asking the question) of each question. This allows readers to determine which questions should be asked to enable a differential diagnosis to be reached.

Primer for differential diagnosis

A 'primer for differential diagnosis' is available for a number of conditions covered. This algorithmic approach to differential diagnosis is geared toward nearly or recently qualified practitioners. The primers are not intended to be solely relied upon in making a differential diagnosis but to act as an aid to memory. It is anticipated that the primers will be used in conjunction with the text, thus allowing a broader understanding of the differential diagnosis of the condition being considered.

Red flags indicative of referral

A summary box of trigger factors explaining when it would be prudent to refer the patient to another healthcare practitioner is presented for each condition. In most cases, a rationale for referral and timescale is presented. These are not absolute, and professional judgement needs to be exercised on a case-by-case basis. For example, a person with a cough of 3 days' duration would not normally constitute a referral, but if the person showed obvious visible signs of being in respiratory distress, then this would require referral.

Evidence-based over-the-counter medication and practical prescribing and product selection

These two sections present, first, an evaluation of the current literature on whether the OTC medicine works, and second, a quick reference to prescribing information.

Side effects listed are drawn from the Summary of Product Characteristics, which can be found via the Electronic Medicines Compendium (https://www.medicines.org.uk/emc). Only side effects listed as very common (≥1/10) or common (≥1/100) are shown unless the product is associated with a more unlikely but serious side effect of which the patient should be made aware.

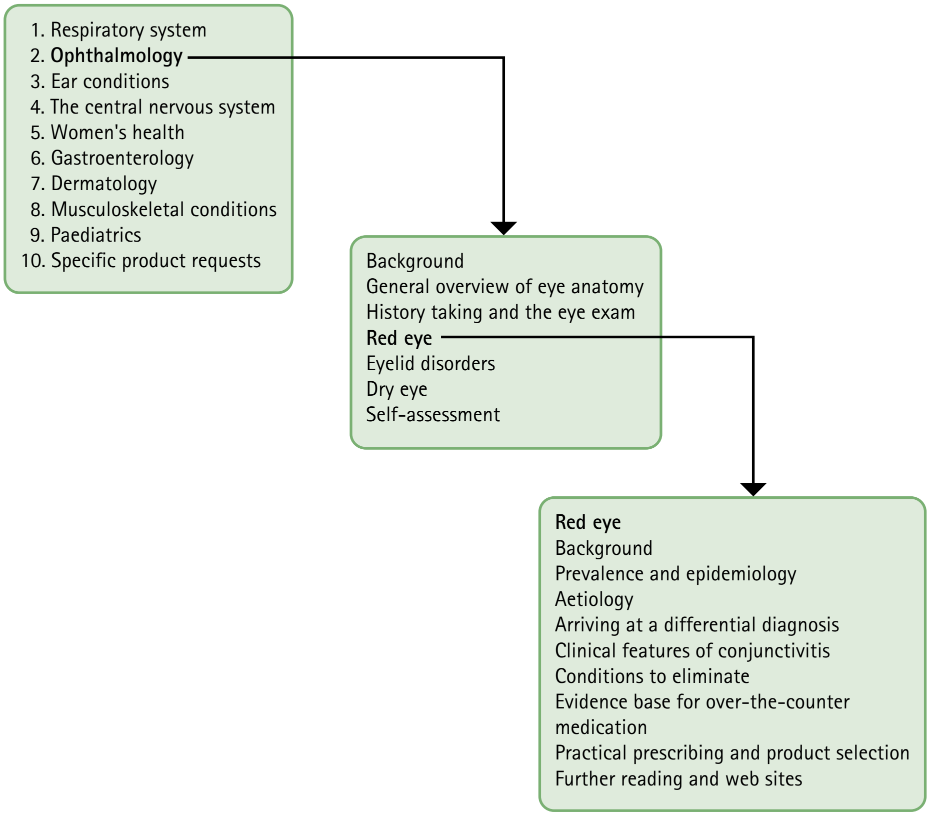
1. Respiratory system
2. Ophthalmology
3. Ear conditions
4. The central nervous system
5. Women's health
6. Gastroenterology
7. Dermatology
8. Musculoskeletal conditions
9. Paediatrics
10. Specific product requests
Background
General overview of eye anatomy
History taking and the eye exam
Red eye
Eyelid disorders
Dry eye
Self-assessment
Red eye
Background
Prevalence and epidemiology
Aetiology
Arriving at a differential diagnosis
Clinical features of conjunctivitis
Conditions to eliminate
Evidence base for over-the-counter medication
Practical prescribing and product selection
Further reading and web sites

Fig. 2 Structure of the book.

The pregnancy and breastfeeding recommendations are based largely on those from standard texts, such as Briggs' *Drugs in Pregnancy and Lactation*, Schaefers' *Drugs in Pregnancy and Lactation* and the Breastfeeding Medicines Advice Service (https://www.sps.nhs.uk/home/about-sps/get-in-touch/medicines-information-services-contact-details/breastfeeding-medicines-advice-service).

Many manufacturers of OTC medicines advise against their products being used in these groups, but when possible, reference is made in the summary tables to the recommendations made from these standard sources. This, hopefully, will provide extra information for practitioners when faced with queries from pregnant and lactating women and allow them to recommend products when manufacturer information stipulates avoidance.

Hints and tips boxes

A summary box of useful information is provided, which contains information that does not fall readily into any of the other sections but is nonetheless useful. For example, some of the 'Hints and tips' boxes give advice on how to administer eye drops, suppositories and other forms of medicines.

Further reading and websites

To supplement the text, a list of selected references and further reading at the end of each condition is provided for those who wish to seek further information on the subject. Websites are also provided, and all sites were active and relevant at the time of writing (Autumn 2024).

Self-assessment questions

Multiple-choice and extended matching questions are presented at the end of each chapter. Rationales for the answers of all questions are also provided.

Case studies

Case studies are provided for each chapter. Most cases have been written to allow readers to consider their type 2 thinking and clinically reason through the case. Cases highlight the problem representation and have a clinical reasoning summary and include safety netting. Safety netting has been considered from the perspective of both a prescribing and nonprescribing pharmacist.

All information presented in the book is accurate and factual as far as the author is aware. It is acknowledged that guidelines change, products become discontinued and new information becomes available over the lifetime of a book. Therefore, if any information in the book is not current or valid, the author would be grateful of any feedback to ensure that the next edition is as up to date as possible.

Chapter 1

Making a diagnosis

CHAPTER OUTLINE

What is clinical reasoning? 1
Why use clinical reasoning? 2
How effective is clinical reasoning? 2
Models of clinical reasoning 2
How do you develop your clinical reasoning skills? 3
Reflective practice 3
Think-aloud technique 3
Metacognition: thinking about what you are thinking 3
Making a diagnosis 3
Problem representation 3
Hypothesis generation 3
Hypothesis testing and refinement 4
Red flags 4
Management 4
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Clinical reasoning: a worked example 4
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Problem representation 4
Likely diagnoses 4
Possible diagnoses 5
Continued information gathering 5
Problem refinement 5
Red flags 5
Management 5
Safety netting 6
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Heuristics 6
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Mindlines 6
Murtagh's process 6
Semantic qualifiers 6
Spot diagnosis 6
Self-labelling 6
Pattern recognition 6

A pharmacist's scope of practice working in primary care is far broader today than it ever has been as the role becomes ever more clinical and patient centred. This will only expand when all graduates join the General Pharmaceutical Council register as independent prescribers starting in 2026. Historically, 'responding to symptoms' has only been included in School of Pharmacy curricula since the late 1980s, when mnemonics were advocated as an information-gathering tool. This approach has been widely adopted and to some extent is still promoted. In the United Kingdom, WWHAM (Who is the patient; What are the symptoms: How long have symptoms been present; Action taken; Medication being taken) is the most common mnemonic in use, but it is now not 'fit for purpose' for pharmacist use. Unsurprisingly, research has shown that community pharmacists overrely on using this type of questioning strategy and that they perform poorly in establishing the correct diagnosis. This is largely because mnemonics are rigid and inflexible. Other methods of eliciting information, such as clinical reasoning, are much better at arriving at a correct diagnosis.

What is clinical reasoning?

Making decisions is an everyday activity, whether it is at home or the workplace. Decisions can be straightforward and simple through to difficult and complex. It is likely that everyone, to some extent, uses clinical reasoning, but they do not necessarily use it consciously or consistently. It is a learnt skill, and being more aware of its key elements should allow for better decisions to be made. The ability to effectively use this skill depends on time and experience, and mastery of the process is often described as moving from 'novice' to 'expert' practice.

The ability of clinicians to take wise actions when faced with problems is at the heart of clinical practice. Clinical reasoning is a process by which clinicians collect, process and interpret patient information and come to an understanding of a patient problem or situation, plan and implement interventions, evaluate outcomes and reflect on and learn from the process.

Clinical reasoning is a complex cognitive process and is underpinned by the clinician's having sound knowledge, having good communication and consultation skills, using evidence-based practice and using reflective practice. It is a dynamic process in which scientific knowledge, clinical experience and critical thinking, combined with existing and newly gathered information about the patient, are assessed against a backdrop of clinical uncertainty. This is not a linear process, and it is more cyclical because one step informs the next (Fig. 1.1).

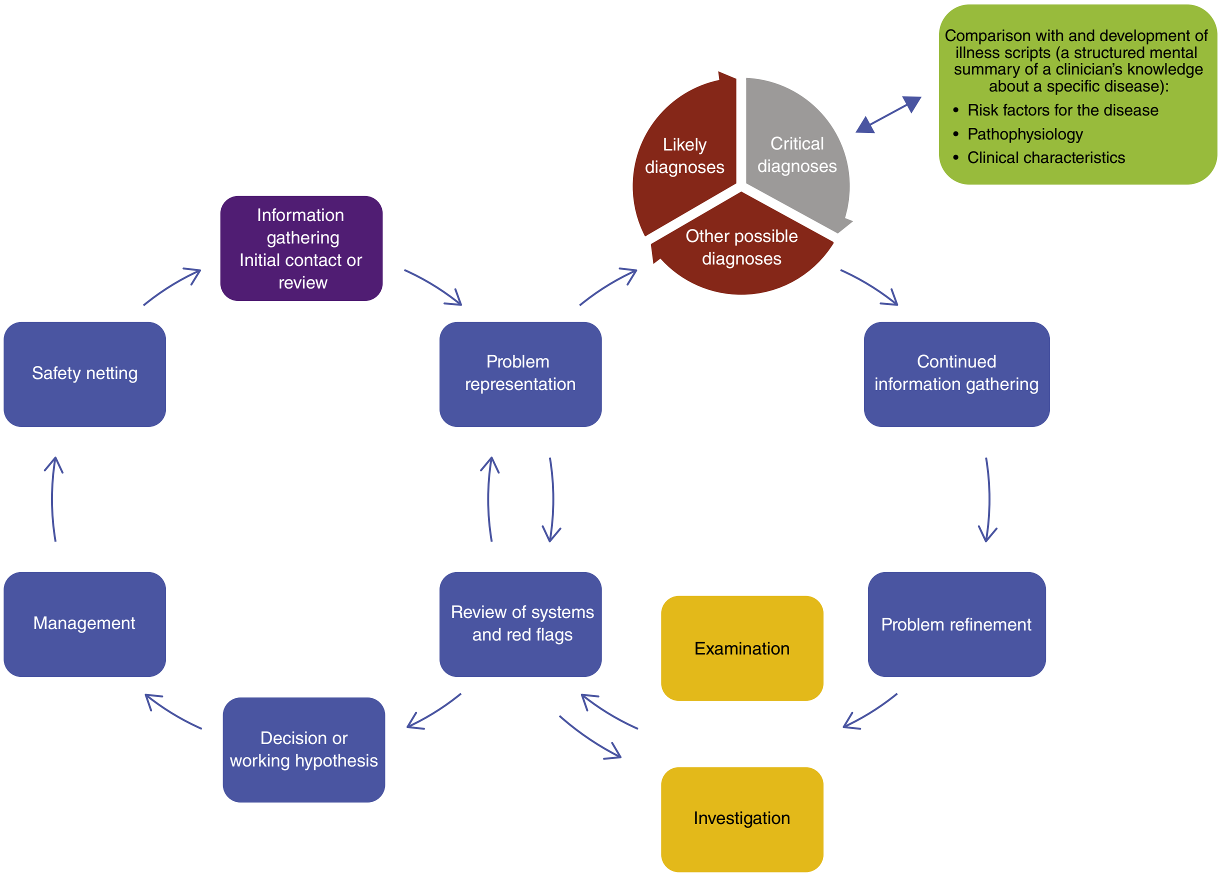
Comparison with and development of illness scripts (a structured mental summary of a clinician's knowledge about a specific disease):
• Risk factors for the disease
• Pathophysiology
• Clinical characteristics
Likely diagnoses
Critical diagnoses
Other possible diagnoses
Information gathering Initial contact or review
Safety netting
Problem representation
Continued information gathering
Management
Review of systems and red flags
Examination
Problem refinement
Decision or working hypothesis
Investigation

Fig. 1.1 The clinical reasoning cycle. The cycle starts at initial contact with the patient when early information is given or sought, leading to formulation of the problem representation. At this point either a hypothesis is generated (and the reasoning process follows the right-hand side of the figure) or a spot diagnosis may be made (negating hypothesis generation) before both processes move to the left-hand side of the circle, where decisions are made and treatment plans are put in place.

Why use clinical reasoning?

Adverse patient outcomes, such as misdiagnosis, inappropriate treatment and poor management of complications, are linked to poor clinical reasoning. A number of studies across different health disciplines have shown that those who have effective clinical reasoning skills have a positive impact on such patient outcomes. Within pharmacy education and practice, the use of mnemonics has been widely advocated for information gathering to generate diagnoses. Studies have shown that those using this approach show limited clinical reasoning and frequently arrive at the wrong diagnosis.

How effective is clinical reasoning?

Clinical reasoning is not perfect, and 10% to 15% of patient consultations result in a diagnostic error through a wrong, delayed or missed diagnosis, with the consequences being potentially harmful and costly. Many factors contribute to diagnostic errors, but they are usually related to healthcare process errors or individual human error, known as *cognitive bias*. A number of recognised cognitive bias types are associated with clinical reasoning, especially when using fast, intuitive thinking. Common examples of this type of error include ‘anchoring’ (an overreliance on the first piece of information gained) search satisficing (when questioning stops because we have found something that fits instead of exploring alternatives) and confirmation bias (looking for information that supports one’s thinking rather than looking for evidence to refute it when evidence is clearly present). Cognitive biases are subconscious, but strategies can be put in place to mitigate them (e.g., deliberately ‘slowing down’ one’s thought process and adopting metacognition.)

Models of clinical reasoning

Much has been written on the clinical reasoning process, and a number of models of reasoning have been put forward and described, though the most commonly cited models in healthcare appear to be type 1 and type 2 thinking, often referred to as the dual process theory.

Type 1 thinking is usually used by clinicians who have prior experience dealing with a similar problem and have gained some level of expertise. Type 1 thinking is quick and intuitive and enables the clinician to make a person-centred diagnostic or treatment decision without needing to consult more widely. Shortcuts are used to aid this way of thinking and have been described as 'illness scripts', 'heuristics' and 'mindlines'.

Type 2 thinking is slow, analytical, controlled and deliberate; it is often used by 'novice' clinicians (i.e., those with limited exposure to the problem at hand). Using type 2 thinking takes time and requires the clinician to research the problem so they can then make an informed decision.

The extent to which decision-making is used can be described as a 'cognitive continuum' that runs from intuition (type 1) at one end of the spectrum to analytical thinking (type 2) at the other.

Usually clinicians use intuition and experience to make decisions when there is typically a high volume of simple decisions to be made. At the other end of the spectrum, there may be complex decisions to be made when the level of uncertainty is high and an analytical and evidence-based approach is needed. In other words, experienced clinicians use type 1 thinking, only switching to type 2 thinking when they override their type 1 thinking. For example, when a person encounters a new clinical problem, they revert to using type 2 reasoning.

How do you develop your clinical reasoning skills?

The foundations of clinical reasoning should be embedded within all healthcare curricula. However, this is currently not the case, and there is wide variation both within and across different professions, though it is most developed in medical courses. For other professions, there is an acknowledgement that graduates often possess the prerequisite knowledge and procedural skills but are not 'work ready' because they lack the clinical reasoning skills needed to respond to clinical situations. These 'novice' graduates therefore need to effectively learn clinical reasoning whilst 'on the job'. A number of strategies can be used to improve performance, but they require mentorship or coaching, for example, as discussed next.

Reflective practice

Reflection allows for interpretation of experiences. In clinical reasoning, reflection involves evaluating all aspects of the clinical encounter (e.g., yourself, the patient, the context, the environment operating in). This can occur directly after the encounter (reflection on action) about what happened or preparing for future encounters by thinking about previous encounters and identifying knowledge gaps (reflection for action).

Think-aloud technique

Here the person is encouraged to talk through their thoughts about a case. This allows the person to articulate their reasoning and explanations for the decisions they make in response to information they gain from the patient. This approach helps to build sound reasoning and helps the clinician to be more aware of cognitive errors.

Metacognition: thinking about what you are thinking

This involves self-monitoring and correcting your own learning processes. You should regularly ask questions such as: What do I already know? Do I really know what I think I know? How can I be sure of this?

Making a diagnosis

Problem representation

The starting point in all consultations is when the patient first presents or is identified for a review. This provides an opportunity to listen to the patient (as Osler's maxim states, 'Listen to your patient; they are telling you the diagnosis') and acquire 'data' via exploratory information gathering of the patient's current health status. This is not limited to the information that the patient tells you and should be combined with cue acquisition—that is, data about the person gained through observation (e.g., age, sex, ethnicity) and any clinical data (e.g., parameters that 'quantify' their management; this could be biochemical data or blood tests) available.

At this point and often at the subconscious level, the practitioner defines the problem, known as problem representation. The problem representation is a one-sentence summary that highlights the defining features of a case. It is composed of three critical components:

- Clinical context: who the patient is (e.g., age, sex, risk factors from past, social, family, medication history)
- The temporal pattern of illness: the length and nature of the symptom (e.g., acute vs chronic, intermittent vs constant or stable vs progressive)
- Key symptoms and examination findings that relate to the presenting symptoms

Construction of a problem representation helps practitioners to crystallise their thoughts and generate a hypothesis to test. As the practitioner gains more information from the patient, the problem representation is refined and updated, so it is an iterative process.

To illustrate the properties of effective problem representations, consider the following case:

A father of a 5-year-old son presents to the pharmacy on a Saturday morning. His son has a rash on his face that came on quickly over the past day or so. His son is at home because he is a bit off-colour, but the father has not taken his son's temperature.

This can be framed as:

A 5-year-old male *(Who is the patient?)* presents with a 24-hour history *(time course)* of acute onset of facial rash with malaise *(clinical symptoms)*.

Hypothesis generation

The problem representation activates clinician illness scripts and through a comparison process develops a prioritised differential diagnosis based on the degree of match between the patient's problem representation and previous illness scripts. At this point, a tentative differential diagnosis can be hypothesised and tested, but this prioritised list is also shaped by the 'Murtagh process', a diagnostic strategy that depends on learning the most common cause of the presenting problem and a shortlist of serious diagnoses which must be ruled out (most likely, possible and critical diagnoses as seen in Fig. 1.1).

Hypothesis testing and refinement

After a limited number of hypotheses have been formulated, they are used to guide subsequent data collection and integration. Each hypothesis can be used to predict what additional findings should be present if it were true, and then questions act as a guided search for these findings; hence, the method is hypothetico-deductive. Novices and experienced physicians alike attempt to generate hypotheses to explain clusters of findings. In short, hypothetico-deductive reasoning involves information from the patient that is gathered and used to construct a hypothesis, which is then tested, and if this proves to be false, then a further hypothesis is constructed.

There is no set order in which questions should be asked, but the responses given by the patient will influence thinking and consequently shape the subsequent questions asked. It is therefore very likely that different practitioners will ask questions in a different order but ultimately arrive at the same conclusions. In summary, it is about asking the right question at the right time for the right reason.

As more information is gained, the hypotheses can be revised and reranked. It is likely that the clinician will work iteratively, refining problems, until a differential diagnosis is established. This is especially true if the clinician adopts a deductive clinical reasoning model. When inductive reasoning is used, 'shortcuts' are often observed. This is seen extensively with expert practitioners drawing on memory from previous presentations. In effect, multiple previous cases are used as an overlay to help decision-making to the case in front of the clinician, which incorporates an understanding of contributory risk factors, pathophysiology and clinical characteristics.

At the end of this process, the clinician should have a working diagnosis.

Red flags

Red flags are troublesome or worrying symptoms that are suggestive of a patient who may be more acutely ill or who has more immediate and complex health needs. During the process of establishing a diagnosis, it is likely that red flags will have been identified. However, taking a 'diagnostic pause' and further checking, when relevant, should be undertaken before considering management.

Management

Management plans should be made with the patient and take account of their ideas, concerns and expectations. This involves measures that the patient can take themselves (self-care); prescriber interventions, including pharmacologic or nonpharmacologic; instigation of further tests or referral to another healthcare professional.

Safety netting

Clinical uncertainty will always exist, and we must acknowledge that we cannot get things right all the time. Safety netting was formally introduced nearly 30 years ago by Roger Neighbour. It has subsequently become an essential part of patient consultations and is widely recommended in national guidelines. This is despite a lack of consensus in agreeing when it should be used or what information needs to be included. A 2019 review by Jones et al. (2019) set out to clarify this concept and concluded that safety netting is more than a mechanism to communicate uncertainty; rather, it provides patient information on red-flag symptoms and a plan for timely reassessment of a patient's condition and still relates closely to that proposed by Neighbour.

Effective safety netting should include three components:

- What you think the problem is and what you expect to happen: information on the natural history of the illness (e.g., 'I think the earache is likely to be caused by an infection, and it should clear up in 2 or 3 days')
- How the person would know if you are wrong: alert or advise on worrying symptoms (e.g., 'Let us know if the pain goes on longer than this or you develop a discharge from the affected ear')
- What they should do then: information on follow-up investigations or referrals (e.g., 'Go and see your doctor')

Clinical reasoning: a worked example

Presentation

Mr C, a 40-year-old male who is unknown to you, asks for some eye drops to help with a sore right red eye. He has had the symptoms for 2 days and describes the soreness as general discomfort.

Problem representation

A 40-year-old male presents with a 2-day history of unilateral eye redness causing discomfort.

Hypothesis generation *(likely, possible and critical diagnoses)*

Conjunctivitis is the most common cause of red eye seen. It appears that Mr C is likely to have either viral or bacterial conjunctivitis (not allergic or chlamydial because these are more likely to be an initial bilateral presentation) and forms our initial hypothesis to test.

Likely diagnoses

- Bacterial conjunctivitis
- Viral conjunctivitis

However, we still need to be mindful that it could be a range of other eye problems that will need to be considered if our initial hypothesis turns out to be incorrect.

Possible diagnoses

Likely (unilateral presentations)

- Subconjunctival haemorrhage
- Episcleritis
- Herpes simplex virus (HSV) infection
- Scleritis

Unlikely (because usually bilateral)

- Allergic conjunctivitis
- Blepharitis
- Chlamydial conjunctivitis
- Dry eye syndrome

Very unlikely (and critical) diagnoses

- Acute closed-angle glaucoma
- Anterior uveitis
- Corneal abrasion or foreign body
- Keratitis (corneal ulcer)

Continued information gathering

A good understanding of how these conditions present is needed to allow us to ask pertinent questions and 'match' the patient's symptoms to the two most likely conditions. The table summarises these two conditions.

	Bacterial conjunctivitis	Viral conjunctivitis
Eyes affected	Initially unilateral but generally affects both eyes	
Discharge	Often mucopurulent secretions with bilateral glued eyes upon awakening	Watery
Pain	Mild to moderate; gritty discomfort often described as a 'foreign body' sensation	Gritty discomfort and associated mild itching
Distribution of redness	Generalised and diffuse	Generalised
Associated symptoms	Commonly none	Cough and cold symptoms

On presentation we know that Mr C has had the symptoms for 2 days and is experiencing some level of discomfort. We need to establish the nature and severity of this discomfort.

Mr C reports that his eye is sore and aching and is 'bothering him'.

This does not seem a 'good fit' for either form of conjunctivitis.

You also ask if he has noticed any discharge.

He reports his eye has been watering.

This seems to further rule out bacterial conjunctivitis as the cause.

At this point an eye examination will help to determine the extent of redness.

On inspection his eye is diffusely red, which is consistent with viral conjunctivitis.

Based on these questions, it appears that a bacterial infection is not the cause, and although some symptoms are consistent with viral conjunctivitis, not all of the symptoms match.

Problem refinement

To further explore if Mr C's symptoms are viral in origin, it would be worth asking about associated symptoms. Often patients with viral conjunctivitis exhibit upper respiratory tract symptoms.

Mr C reports no such recent symptoms.

This casts more doubt on your thinking. At this point we need to consider other possible diagnoses of his red eye.

Allergic and chlamydial conjunctivitis (bilateral presentation), subconjunctival haemorrhage (painless), blepharitis (lack of generalised scleral redness, longer duration and wrong age group), episcleritis (segmental redness and mostly painless) and dry eye syndrome (wrong age group) do not seem to be the cause of his symptoms.

From the list of likely diagnoses, we still need to consider scleritis and HSV as possible causes. Both can exhibit the symptoms experienced by Mr C. Like episcleritis, scleritis tends to show segmental redness rather than generalised redness, and at this point a tentative diagnosis of HSV is made.

Before any sort of management plan is put in place, you need to check for red flags and the possibility of a critical diagnosis. Further eye inspection to test for visual acuity and pupil size, shape and reaction needs to be conducted.

You find Mr C's acuity is slightly decreased, and his pupil is irregular.

Although decreased acuity can be seen with HSV, the pupil should be normal. An irregular pupil is a red-flag symptom and seen in uveitis, keratitis and glaucoma.

Symptoms of uveitis include eye or eyebrow ache and mild photophobia. We already know he has described the pain as aching, which seems to support a diagnosis of uveitis.

Red flags

Although patients with glaucoma, corneal abrasion and keratitis can show decreased visual acuity or abnormal pupil reactions, the level of pain will be much greater, so this seems like an unlikely cause of Mr C's symptoms.

Management

Uveitis is outside the remit of most practitioners. Mr C requires urgent referral to an ophthalmologist for further assessment.

Safety netting

Early and frequent follow-up should be instigated to assess the patient's response to treatment and monitor for complications (e.g., deterioration in vision).

Glossary of terms

Clinical prediction rules

The use of well-defined and widely validated series of scoring systems to help increase the diagnostic probability of a particular condition (e.g., FEVERPain for streptococcal sore throat).

Expert and novice practitioner

The difference between novices and experts lies in the speed and accuracy of the hypotheses made and the method and efficiency of weighing evidence for and against the hypothesis.

Heuristics

Heuristics are mental shortcuts that allow people to solve problems and make judgments quickly and efficiently. These rule-of-thumb strategies shorten decision-making times and allow people to function without constantly stopping to think about their next course of action.

Illness scripts

These are an abstract mental representation of an illness. They are used to compare a patient's clinical presentation (i.e., the patient's 'script') against the practitioner's own mental models of a disease (i.e., our own illness scripts). They develop as a consequence of theoretical knowledge acquisition as well as accumulated experience. This means that trainee and newly qualified practitioners may have had limited opportunities to build a repository of illness scripts. Through a comparison process, the clinician develops a prioritised differential diagnosis based on the degree of match between the patient's problem representation and previous illness scripts.

Mindlines

These are similar to the concept of illness scripts because they are learnt, internalised sequences of thought and behaviour but seem to be more reliant on professional interactions (e.g., a result of seeking specialist advice and discussion with others).

Murtagh's process

This is a diagnostic strategy that depends on learning the most common cause of the presenting problem (the 'probability diagnosis') and a shortlist of serious diagnoses which must be ruled out (e.g., viral cough is the commonest cough type, but malignancy, heart failure and so on must routinely be ruled out even if these diagnoses have not been triggered by the presentation).

Semantic qualifiers

Semantic qualifiers are paired opposing descriptors that are used to compare diagnostic considerations (e.g., sharp vs dull, acute vs chronic, tender vs nontender). They help to facilitate retrieval of stored information from illness scripts to aid diagnostic reasoning and reflect the meaning attached to the clinical data.

Spot diagnosis

This is recognition of a particular nonverbal pattern, usually visual (e.g., skin lesions) or auditory (e.g., cough). A spot diagnosis is almost instantaneous but relies on previous experience of the condition. It does not require any further questioning of the patient.

Self-labelling

The patient presents with a self-diagnosis, which may or may not be correct and is often based on personal previous experience of similar signs or symptoms. This tends to influence the clinician's questioning strategy.

Pattern recognition

Signs and symptoms are compared with previous patterns or cases, and a disease is recognised when the actual pattern fits. This is the refinement strategy that relies on memory of known patterns.

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Chapter 2

Skills needed to facilitate clinical reasoning

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Besides having good subject knowledge, clinical reasoning is underpinned by:

- Good consultation and communication skills
- Evidence-based practice
- Shared decision-making

Consultation and communication skills

The medical consultation is the principal interaction between the patient and practitioner, enabling a two-way exchange of information and ideas that informs patient care. Unsurprisingly, many models have been developed to provide structure for these complex interactions (Table 2.1). An unstructured consultation can lead to less safe practice or a failure to recognise the real issues raised by the patient and may also lead to an unclear shared management plan. Models allow us to have a better understanding of real-world systems, but no model is perfect, and there is not a ‘one-size-fits-all’ model, with different practitioners being drawn to different models.

A number of models have been developed that encourage a patient-centred, task-oriented and structured approach, for example, the Pendelton, Neighbour and the Calgary-Cambridge models. These three models are widely taught in healthcare programmes.

Pendelton model (1984)

This model was probably the first such model that was ‘patient centred’, and it specifically encourages the clinician to involve the patient in decision-making processes and encourage the patient to take some ownership of their problem. The Pendelton model describes seven tasks that the doctor and patient should complete in the consultation as shown in Table 2.2.

Neighbour model (1987)

The premise of Neighbour’s model is to allow the clinician to consult more skilfully, efficiently and intuitively. It includes elements from the Pendelton model, but it introduced the concept of ‘summarising, housekeeping and safety netting’. The model includes five elements to help uncover the patient’s unspoken agenda (Table 2.3).

Calgary-Cambridge model (1996)

This model builds on the connecting (rapport) element of the Neighbour model. It also incorporates effective communication (e.g., concepts of active listening and nonverbal behaviour; these are outside the scope of this introduction, so see the Further reading for more information) and considers the physical, psychological and social aspects of the consultation. It is broken down into four distinct sequential key steps:

- Initiating the session
- Gathering information (including the physical examination, often listed as a fifth distinct step)
- Explanation and planning
- Closing the session

In addition to these steps, two ‘threads’ run through the consultation, which are:

- Providing the consultation structure
- Building relationships

Table 2.1
Commonly encountered medical models of consultation (not exhaustive)

Model name	Pros	Cons
Traditional biomedical model	Concentrates on the diagnosis This approach is still used when a patient is first admitted to a hospital	Clinician centred Not concerned with what a patient thinks or the effects of the illness on the patient's life Time consuming and often covers areas of little relevance
Physical, psychological and social (1972)	First model to consider the patient's point of view	Simplistic regarding patient involvement
Health belief model (1975)	Introduced 'ICE'—the ideas, concerns and expectations of the patient Good model for the 'worried well'	Does not account for a person's attitudes or beliefs Does not account for environmental or economic factors that may prohibit or promote the recommended action
Six-category intervention analysis (1976)	Provides 'options' for how the clinician can support the patient	Need to know which option to use and when to switch from this to another
Pendleton model (1984)	Involves the patient Encourages patient to take responsibility	Less useful for acute (potentially serious) problems Can be time consuming
McWhinney's disease-illness model (1986)	Simple and practical Tries to meet both clinical and patient agendas	Can be time consuming
Neighbour model (1987)	Introduced safety netting Simple Encourages the patient to take responsibility	Can be more doctor centred than patient centred
The Calgary-Cambridge model (1996)	Comprehensive Structured but helps to build rapport	Can be time consuming
Narrative based (2002)	Understanding of the patient's experience of their illness	Can be time consuming

Table 2.2
The Pendleton model of consultation

Component	Description
1. Establish the patient's reason for attendance.	Determine the nature and history of the problem(s). Determine the cause of the problem(s). Explore the patient's health beliefs. Establish the consequences of the problem(s).
2. Consider if there are other problems.	Consider factors that have an impact on the patient (e.g., social issues).
3. Choose an appropriate management plan for each problem.	Work jointly with the patient.
4. Work together to achieve a shared understanding of each problem.	
5. Involve the patient in the management plan.	Encourage the patient to adopt an appropriate degree of responsibility for each problem.
6. Use time and resources efficiently.	This means both in the consultation and the longer term.
7. Establish and maintain a lasting relationship with the patient that helps to achieve other tasks.	Develop trust.

Table 2.3
The Neighbour model of consultation

Component	Description
Connecting (rapport building)	● Establish a working relationship. ● See things from the patient's perspective.
Summarising (eliciting information)	● Why has the patient come? ● Discover the patient's ideas, concerns and expectations ● Summarise back to the patient. ● Provide an opportunity for the patient to correct the clinician before moving on with the consultation.
Handover	● The clinician and patient formulate a management plan together. ● Provide an opportunity to check understanding. ● The patient takes responsibility for some aspects of the plan.
Safety netting	● The clinician and patient plan together to manage uncertainty. ● Empower the patient to be aware of worrying signs or symptoms. ● Know what to do and when to do it.
Housekeeping (for the clinician)	● Acknowledge and deal with emotions arising from the consultation before seeing the next patient.

This model is now the most widely adopted model in healthcare courses; a detailed breakdown of each step is shown in Table 2.4.

Remote consultations

Remote consultations can be conducted by telephone, video link or online. Consultation via telephone has been common practice for many years, but because of the COVID-19 pandemic, video and online consultations are now almost universally available in general practice.

The General Medical Council has provided guidance to doctors on assessing if a remote consultation is appropriate and issued 10 principles to remote prescribing. Additionally, the Royal College of General Practitioners (RCGP) provides learning materials to support general practitioners on remote consultation and triage, and bodies such as NHS Improvement provide templates on establishing remote 'total triage' models. In general, remote consultations are appropriate when:

- Clinical need or treatment is straightforward.
- There is no need for a physical examination.
- The patient has the capacity to decide about treatment.
- Safe systems are in place to prescribe.

Consultation models versus remote consultation

All models were developed for face-to-face consultations. One important critique of the Calgary-Cambridge and Neighbour models within remote consultation is that the lack of face-to-face contact can mean it is hard to detect many of the cues described within the models. For example, visual cues (obviously absent in telephone calls) can be harder to see or pick up on a screen. Intonation of voice and pitch can also be more difficult to interpret, and nonverbal behaviours are harder to see or read. In addition, there are several cues one needs to be alert for on the telephone that are not included in these models, such as silence and hesitation. If these cues are missed, the rapport-building and connecting stages of the consultation may be affected. This could have an impact on subsequent stages. Despite this, several sources (including the RCGP) have encouraged the use of the Neighbour model for remote consultations.

Evidence-based practice

What is evidence-based practice?

Evidence-based medicine (EBM) and evidence-based practice (EBP) are not new concepts. There are numerous definitions of EBM, but the most accepted comes from David Sackett and colleagues, who described EBM as 'the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients … integrating individual clinical expertise with the best available external clinical evidence from systematic research' (Sackett et al., 1996). This definition encapsulates the important aspects of practising in an evidence-based fashion. First, we need to be conscientious and explicit in the use of evidence, meaning we need to seek out and keep up to date with the current evidence for the efficacy and safety of each medicine. Second, EBM involves integrating clinical knowledge with evidence, meaning that neither should dominate decision-making processes. We should not make decisions based on our clinical experience alone because our experiences may be biased. For

Table 2.4
The Calgary Cambridge model of consultation

Initiating the session	
Establishing initial rapport	● Greet the patient and obtain the patient's name. ● Introduce self and clarifies role. ● Demonstrate interest and respect.
Identifying the reason(s) for the consultation	● Identify the patient's problems ● Listen (actively) without interrupting or directing the patient's response. ● Confirm the list and screen for further problems. ● Negotiate the agenda, taking both the patient's and the physician's needs into account.
Gathering information	
Exploring problems	● Encourage the patient to tell the story in their own words (clarifying the reason for presenting now). ● Use appropriate questioning. ● Actively listen. ● Facilitate the patient's responses verbally and nonverbally. ● Pick up verbal and nonverbal cues. ● Clarify the patient's statements. ● Periodically summarise to verify own understanding. ● Use concise, easily understood, jargon-free questions and comments. ● Establish dates and sequence of events.
Additional skills for understanding the patient's perspective	● Explore the patients' ideas, concerns and expectations. ● Encourage the patient to express their feelings.
Providing structure	
Making organisation overt	● Summarise to confirm understanding. ● Progress from one section to another using sign posting and transitional statements.
Attending to flow	● Structure the interview in logical sequence. ● Attend to timing and keeping the interview on task.
Building the relationship	
Using appropriate nonverbal behaviour	● Use appropriate nonverbal behaviour. ● Demonstrate appropriate confidence.
Developing rapport	● Accept the patient's beliefs. ● Demonstrate empathy. ● Provide support. ● Deal sensitively with embarrassing and disturbing topics.
Involving the patient	● Share thinking with the patient. ● Explain the rationale for questions. ● Explain the process during the physical examination.
Explanation and planning	
Providing the correct amount and type of information	● Chunks and checks: give information in assimilable chunks; check for understanding. ● Assess the patient's starting point. ● Ask the patient what other information would be helpful. ● Give explanations at appropriate times.
Aiding accurate recall and understanding	● Organise explanations and judicious use of repetition and summarising to reinforce information. ● Use concise, easily understood, jargon-free statements. ● Use visual methods of conveying information when appropriate. ● Check the patient's understanding of the information.

Table 2.4
The Calgary Cambridge model of consultation (Continued)

Initiating the session	
Achieving a shared understanding: incorporating the patient's perspective	• Relate explanations to the patient's viewpoint. • Encourage the patient to contribute.
Planning: shared decision-making	• Share own thinking as appropriate. • Involve the patient by making suggestions, not issuing directives. • Encourage the patient to contribute their thoughts: ideas, suggestions and preferences. • Negotiate a mutually acceptable plan. • Offer choices: encourage the patient to make choices and decisions to the level that they wish. • Check with the patient if plans accepted and if concerns have been addressed.
Closing the session	
Forward planning	• Agree upon next steps. • Provide safety nets.
Ensuring appropriate point of closure	• Summarise the session briefly and clarify the plan of care. • Make a final check that the patient agrees and is comfortable with the plan.

example, we may get the impression that a treatment works because people return to tell us how 'wonderful' the treatment that we recommended was, without knowing how many people found the treatment useless and vowed to never use it again. However, evidence from clinical trials should not be the sole basis for decision-making either because the change not be applicable to the patient you have before you; incorporating both clinical experience and evidence is required. Some critics have accused EBP as being too 'standardised', with all clinicians practicing the same way. However, this in fact ignores the important fundamental principle that each clinician must use their clinical experience, in addition to good external evidence, to reach a decision. Therefore, by definition, each decision-making process using EBP is different. Finally, we should seek out the 'best' evidence, meaning we need to understand which types of evidence are more robust and which evidence is less reliable.

What is good evidence?

Practising in an evidence-based way means using the *best* available evidence. As a guide, a hierarchy of evidence has been developed. This grading is based on the level of potential bias in the study design, with those with lowest potential for bias given the highest ranking. The abbreviated ranking, from highest to lowest is:

- Systematic reviews of randomised controlled trials
- Well-conducted randomised controlled trials (RCTs)
- Observational studies (e.g., cohort and case-control studies)
- Case series and case studies

Thus, ideally, decisions should be based on systematic reviews followed by RCTs. It is important to note that 'expert opinion' is no longer considered a reliable source of evidence.

To have confidence in the findings from such data, studies need to be designed in a robust way that is subject to external scrutiny that assesses the 'quality' of the evidence. Thankfully, assessment tools have been developed (e.g., PRISMA; http://www.prisma-statement.org) and are used to determine quality, allowing clinicians to trust evidence that is readily accessible to them through portals such as the Cochrane Library (https://www.cochranelibrary.com).

Interpreting the evidence

When examining the outcome of a study, two things need to be considered: was the effect seen *statistically* significant, and was the effect seen *clinically* significant? To do this we need to first look at the metrics used to measure outcomes in studies. The outcomes that are measured in clinical trials can range from surrogate outcomes through to patient-relevant outcomes. Surrogate outcomes are generally biomedical markers; examples include blood pressure, white blood cell counts and bone mineral density. An important feature of a surrogate outcome is that the patient generally cannot feel or report what the outcome is. At the other end of the spectrum, we have patient-relevant outcomes. Arguably, these are the things that we ultimately want to change for a person and include outcomes such as improved quality of life, relief of pain and the ability to undertake normal daily activities. In between are what are called clinical outcomes. These are outcomes directly related to an underlying condition, such as fracture rates in patients with osteoporosis and myocardial infarctions in those with cardiovascular disease. Examples of surrogate, clinical and patient-relevant outcomes can be found in Table 2.5.

Table 2.5
Examples of outcome measures in relation to clinical conditions

Condition outcome	Surrogate outcome	Clinical outcome	Patient-relevant
Osteoporosis	Bone mineral density	Spinal fractures	Pain relief, ability to do normal daily activities
Asthma	FEV_1 or peak flow	Wheeze, use of rescue medication	Ability to play sport
Respiratory tract infection	Viral count or load	Sore throat, fever	Ability to go to work or school

FEV_1, Forced expiratory volume in 1 second.

The advantages of surrogate outcomes are that they are usually easy to measure and can be quantified with a reasonable amount of objectivity. By contrast, patient-relevant outcomes are the most subjective and are often difficult to measure reliably. However, interpreting changes in a surrogate outcome can be difficult unless we know what a change in a surrogate outcome does to, for example, a clinical or patient-relevant outcome. For example, what improvement in forced expiratory volume in 1 second (FEV_1) does a person need to function normally? Most clinical outcomes are examples of dichotomous outcomes such as death, cure, achieving a 10% reduction in body weight and so on. They are commonly expressed by things such as the number needed to treat, the relative risk or the odds ratio.

Statistical versus clinical significance

Being statistically significant does not make the difference a clinically significant difference. Statistical testing is dependent on the variability in the outcome, which is often related to the sample size used in the study. The larger the sample size, the more precise your results usually are and thus the greater the ability to detect even very small differences as being statistically significant. The question that must be asked is 'Would the patient notice this difference?' or 'Am I going to notice a difference in my patients?'

Developing an evidence-based personal formulary

The concept of a 'personal formulary' and the selection of a personal formulary drug ('p-drug') is based on the World Health Organisation's (WHO's) *Guide to Good Prescribing*, which is used to teach medical students to prescribe. Selecting a 'p-drug' involves a systematic, evidence-driven approach to selecting the best medicine to manage a particular condition.

The WHO's approach to select between the possible therapies uses four criteria:

- Efficacy
- Safety
- Patient suitability
- Cost

The first thing we look at is comparative efficacy. If there is nothing to differentiate the treatments based on efficacy, we then consider safety. Again, if there are no significant differences in terms of safety, we would then consider patient suitability and so on. When considering patient suitability, we look at things such as ease of use, better adherence and so forth. The issue of cost is interesting: if you have two or more products that are considered equivalent in terms of efficacy, safety and patient acceptability, then it seems reasonable to offer the patient the less expensive option. An example of this is comparing the imidazoles (e.g., clotrimazole) with terbinafine cream for tinea pedis. There is no appreciable difference in terms of efficacy and safety. However, imidazoles are usually applied several times a day for several weeks, whereas terbinafine is applied once a day for 1 week. If they were the same cost, you would clearly choose terbinafine. However, terbinafine is generally costlier; therefore, it seems reasonable to offer both products to the patient, explaining the difference in dosing and cost and allowing the patient to choose which they prefer.

Shared decision-making

There is a wealth of information supporting shared decision-making (SDM) in contributing to positive patient outcomes, and SDM is now embedded in UK law (e.g., Health and Social Care Act, 2012). The National Institute for Health and Care Excellence (NICE) defines SDM as 'a collaborative process that involves a person and their healthcare professional working together to reach a joint decision about care'.

It could be care the person needs straightaway or care in the future, for example, through advance care planning. It involves choosing tests and treatments based both on evidence and on the person's individual preferences, beliefs and values. It means making sure the person understands the risks, benefits and possible consequences of different options through discussion and information sharing. This joint process empowers people to make decisions about the care that is right for them at that time.

Despite this, recent (2020 and 2022) surveys show people want to be more involved than they currently are in making decisions about their own health and healthcare. NICE offers guidance to organisations and individual clinicians on how to embed SDM into everyday practice. NICE suggests that SDM should be considered:

- Before a patient appointment:
  - Offer the person access to resources that encourage them to think about what matters to them, what they hope will happen as a result of the discussion and what questions they want to ask.

  - Ask if the person wants someone else to be with them during the consultation. If this is not possible or practicable, then offer someone from the team to be their advocate or support.
- During the appointment:
  - Encourage the person to participate and invite questions.
  - Discuss the pros and cons of all treatments and interventions.
  - Ensure ideas, concerns and expectations (ICE) are covered.
  - Make records including what the patient says or wants to happen; all letters to other professionals need to be shared with the patient.
- After the appointment:
  - Provide appropriate resources to help the person understand what was discussed and agreed upon; when needed, offer additional support.
  - Provide details of who to contact if they have further questions.

Shared decision-making in practice

A number of tools can be used by patients and clinicians to facilitate and monitor SDM.

The *Ask 3 Questions campaign* is designed to encourage patients to ask questions and play a more active role in decisions about their treatment and care.

Question 1: What are my choices?
Question 2: What is good and bad about each choice?
Question 3: How do I get support to help me make a decision that is right for me?

An alternative is the *It's OK to ASK campaign,* which adopts the BRAN mnemonic:

Question 1: What are the *b*enefits of my treatment?
Question 2: What are the *r*isks of my treatment?
Question 3: Are there any *a*lternatives I can try?
Question 4: What If I do *n*othing?

The patient could also be asked to complete the SDM-Q-9 survey that looks at how well the clinician (called the 'doctor' on the survey) was involved and explained things to the patient.

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Chapter 3

Respiratory system

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Background

Diseases of the respiratory tract are among the most common reasons for consulting a general practitioner (GP). The average GP sees approximately 700 to 1000 patients each year with respiratory disease. Although respiratory disease can cause significant morbidity and mortality, most conditions are minor and self-limiting.

General overview of the anatomy of the respiratory tract

The basic requirement for all living cells to function and survive is a continuous supply of oxygen. However, a byproduct of cell activity is carbon dioxide, which, if not removed, poisons and kills the cells of the body. The principal function of the respiratory system is therefore the exchange of carbon dioxide and oxygen between blood and atmospheric air. This exchange takes place in the lungs, where pulmonary capillaries are in direct contact with the linings of the lungs' terminal air spaces, the alveoli. All other structures associated with the respiratory tract serve to facilitate this gaseous exchange.

The respiratory system is divided arbitrarily into the upper and lower respiratory tracts. In addition to these structures, the respiratory system also includes the oral cavity, rib cage and diaphragm.

Upper respiratory tract

The upper respiratory tract comprises the structures located outside the thorax—the nasal cavity, pharynx and larynx.

Nasal cavity

The internal portion of the nose is known as the nasal cavity and lies over the roof of the mouth. It is a hollow structure but is separated by a midline partition known as the *septum*. The septum has a rich blood supply, which means that direct blows to the nose result in nosebleeds. The cavity is divided into a larger respiratory region and a smaller olfactory region. The nasal cavity is connected to the pharynx through two openings called the *internal nares*. The respiratory region is lined with cilia and plays an important part in respiration because it filters out large dust particles. The inhaled air circulates, allowing it to be warmed by close contact with blood from the capillaries. Mucus secreted from goblet cells also helps to moisten the air.

Pharynx

The pharynx is a tubelike structure approximately 12 cm long that serves as a common pathway for the respiratory and digestive tracts. It has three anatomic divisions—the nasopharynx, oropharynx and laryngopharynx. It is lined with a ciliated mucous membrane that helps with the removal of dust particles. It also affects speech production by changing shape to allow vowel sounds to be formed.

Larynx (voice box)

The triangular-shaped larynx is a short passageway that connects the pharynx with the trachea, which lies in the midline of the neck. It protects the airway against the entrance of liquids and foods during swallowing via the glottis and epiglottis, which act like trap doors to ensure that liquids and food are routed into the oesophagus and not the trachea.

Lower respiratory tract

The lower respiratory tract is located almost entirely within the thorax. It is composed of the trachea, bronchial tree and lungs.

Trachea (windpipe) and bronchi

The trachea is an 11-cm-long tube that lies in front of the oesophagus and extends from the larynx to the fifth thoracic vertebra, where it divides into the right and left primary bronchi. The bronchi divide and subdivide into bronchioles, resembling an inverted tree trunk, giving rise to the term *bronchial tree*. Eventually, these divisions form terminal bronchioles, giving rise to alveolar ducts and sacs, the walls of which consist of alveoli where gaseous exchanges take place. The epithelial lining of the bronchial tree acts as a defence mechanism known as the *mucociliary escalator*. Fingerlike cilia in the bronchi, on the surface of cells, beat upwards in organised waves of contraction, thus expelling foreign bodies.

Lungs

The lungs are paired, cone-shaped organs divided into lobes; the left lung has two lobes and the right lung three lobes, which occupy the thoracic cavity. The thoracic cavity plays an important part in respiration because it becomes larger when the chest is raised and smaller when it is lowered, affecting inspiration and expiration. Enclosing the lungs are the pleural membranes; the inner membrane covers the lungs, and the outer membrane is attached to the thoracic cavity. Between the membranes is the pleural cavity, which contains fluid and prevents friction between the membranes during breathing. If the pleura is inflamed, respiration becomes painful.

History taking and physical examination

Cough, cold, sore throat and rhinitis often coexist, and an accurate history is therefore essential to differentially diagnose a patient who presents with symptoms of respiratory disease. A number of similar questions must be asked for each condition, although symptom-specific questions are also needed (and are discussed under each heading that follow). Currently, examination of the respiratory tract is outside the remit of community pharmacists unless they are independent prescribers. An examination involving assessment of how the patient is breathing and palpation, percussion and auscultation may support a differential diagnosis after history taking. For example, breath rates below 12 breaths/min or above 25 breaths/min can indicate bradypnoea (e.g., opiate use) or tachypnoea (e.g., respiratory distress). Palpation can reveal chest wall tenderness, percussion can show consolidation as seen in pneumonia and auscultation can reveal abnormal breath sounds indicative of conditions such as asthma and infection.

Cough

Background

Coughing is the body's defence mechanism to clear the airways of foreign bodies and particulate matter. A five-part cough reflex is responsible for cough production. Receptors located mainly in the pharynx, larynx, trachea and bifurcations of the large bronchi are stimulated via mechanical, irritant or thermal mechanisms. Neural impulses are then carried along afferent pathways of the vagal and superior laryngeal nerves, which terminate at the cough centre in the medulla. Efferent fibres of the vagus and spinal nerves carry neural activity to the muscles of the diaphragm, chest wall and abdomen. These muscles contract and are followed by the sudden opening of the glottis, which creates the cough. This is supplemented by the mucociliary escalator.

Cough is the most common respiratory symptom and one of the few ways whereby abnormalities of the respiratory tract manifest themselves. Coughs can be described as productive (chesty) or nonproductive (dry, tight or tickly). However, many patients say that they are not producing sputum, although they may go on to say that they 'can feel it in the chest'. In these cases, the cough is probably productive in nature and should be treated as such.

The British Thoracic Society Guidelines (2019) state that cough is usually self-limiting and will resolve in 3 or 4 weeks. Coughs are classified as acute or chronic in nature, and current UK guidance (as of summer 2024) define cough as follows:

- Acute: present for less than 3 weeks
- Subacute: present for 3 to 8 weeks
- Chronic: present for more than 8 weeks

Although these times are only considered indicative, patients who present with cough, other than an acute cough (not being systemically unwell), are usually best referred to a medical practitioner for further investigation.

Prevalence and epidemiology

Statistics from UK general medical practice show that respiratory illness accounts for more patient visits than any other disease category. These data are echoed elsewhere; for example, episodes of upper respiratory tract infection (URTI) are the most common acute conditions seen in Australian general practice (Cooke et al., 2013). Schoolchildren experience the greatest number of coughs, with an estimated 7 to 10 episodes per year (compared with adults, with 2–5 episodes per year).

Aetiology

The majority of acute coughs are caused by viruses. These include respiratory syncytial virus, rhinovirus and coronavirus. When bacterial pathogens are responsible for cough, these include *Streptococcus pneumoniae, Haemophilus influenzae, Staphylococcus aureus* and *Klebsiella pneumoniae*.

Arriving at a differential diagnosis

Cough is a predominant symptom of many respiratory diseases but can also be of cardiovascular or gastrointestinal (GI) origin. By far the most common causes of acute cough are infections of the upper respiratory tract and acute bronchitis. Table 3.1 highlights other conditions that may be encountered by community pharmacists. Asking symptom-specific questions helps to establish a differential diagnosis (Table 3.2).

Table 3.1

Causes of cough and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Viral infection
Likely	• Acute bronchitis • Upper airway cough syndrome
Unlikely	• Angiotensin-converting enzyme inhibitor induced • Asthma • Chronic obstructive pulmonary disease • COVID-19 • Croup • Pneumonia • Vocal cord dysfunction
Very unlikely	• Bronchiectasis • Cancer • Gastro-oesophageal reflux disease • Heart failure • Lung abscess • Nocardiosis • Pneumothorax • Psychogenic cough • Pulmonary embolism • Sarcoidosis • Tuberculosis

Table 3.2

Specific questions to ask the patient: Cough

Question	Relevance
Sputum colour	Mucoid (clear and white) • Normally of little consequence; suggests that no infection is present Yellow, green or brown sputum • Normally indicates infection; *mucopurulent sputum is generally caused by a viral infection and does not require referral* Haemoptysis • Rust coloured (pneumonia), pink tinged (left ventricular failure) or dark red (carcinoma) • Occasionally, patients can produce sputum with bright red blood as a single event because of the force of coughing, causing a blood vessel to rupture; this is not serious and does not require referral
Nature of sputum	Thin and frothy • Left ventricular failure Thick, mucoid to yellow • Asthma Offensive foul smelling • Bronchiectasis or lung abscess
Onset of cough	Cough worse in the morning • Bronchiectasis, COPD Cough worse in the evening • Viral infection, croup, heart failure Seasonality • Acute viral URTIs have a higher incidence in the winter months
Duration of cough	Duration will shape your thinking as to the cause of the cough. For example: At 3 days • Infection At 3 weeks • Bronchitis • UACS At 3 months • COPD • Heart failure • Lung abscess • Malignancy • Medication
Age of the patient	Children • URTI, asthma and croup Older adults • Heart failure, lung abscess, cancer, nocardiosis, sarcoidosis
Smoking history	• Risk factor for conditions such as COPD, cancer

COPD, Chronic obstructive pulmonary disease; *UACS,* upper airway cough syndrome; *URTI,* upper respiratory tract infection.

Clinical features of acute viral cough

Viral coughs typically present with sudden onset and associated fever. Sputum production is minimal, and symptoms are often worse in the evening. Associated cold symptoms are also often present; these usually last between 7 and 10 days. A duration of longer than 14 days might suggest postviral cough or possibly indicate a bacterial secondary infection, but this is clinically difficult to establish. Point-of-care testing can be used to help determine the cause of cough. For example, immunoassays are now (as of autumn, 2023) being used in GP practices that detect raised levels of C-reactive protein (an inflammatory marker suggesting infection) and myxovirus protein A (a marker for viral infection), helping clinicians to differentiate between bacterial and viral respiratory tract infections.

Conditions to eliminate

Likely causes

Acute bronchitis

Cough is the predominant symptom either with or without sputum production. Wheeze is often present, and the person may be breathless. Other symptoms can be present such as mild fever, malaise and sore throat. Most cases are seen in the autumn or winter. The cough usually lasts for 7 to 10 days but can persist for 3 weeks. The cause is normally viral but sometimes bacterial. Symptoms resolve without antibiotic treatment regardless of the cause. If the person is systemically unwell, a referral may be appropriate.

Upper airway cough syndrome

Upper airway cough syndrome (UACS) is characterised by a sinus or nasal discharge that flows behind the nose and into the throat. Patients usually present with a runny or blocked nose, nasal dripping and an itchy throat. Cough is highly variable, affecting between 10% to 80% of people. Patients should always be asked whether they are swallowing mucus or notice that they are clearing their throats more than usual. Chronic cough is characteristically associated with UACS.

Allergies are one cause of UACS. Coughs caused by allergies are often nonproductive and worse at night. However, there are usually other associated symptoms, such as sneezing, nasal discharge or blockage, conjunctivitis and an itchy oral cavity. Cough of an allergic origin might show seasonal variation, for example, hay fever. Management of UACS involves use of antihistamines, decongestants, or both.

Unlikely causes

Angiotensin-converting enzyme inhibitor–induced cough

Angiotensin-converting enzyme (ACE) inhibitors are commonly associated with cough. The incidence might be as high as 16%; it is not dose related, and time to onset is variable, ranging from a few hours to more than 1 year after the start of treatment. Cough invariably ceases after withdrawal of the ACE inhibitor but takes 3 to 4 weeks to resolve. If an adverse drug reaction is suspected, the pharmacist should discuss an alternative medicine with the prescriber; for example, the incidence of cough with angiotensin II receptor blockers is half that of ACE inhibitors. Other medicines have been rarely associated with cough or wheeze, including nonsteroidal antiinflammatory drugs (NSAIDs), sitagliptin, calcium channel blockers and beta-blockers.

Asthma

The exact prevalence of asthma is unknown because of differing terminologies and definitions, plus difficulties in correct diagnosis, especially in children, and comorbidity with chronic obstructive pulmonary disease (COPD) in older adults. The best estimates of adult asthma prevalence are approximately 4% to 10%. In children, the figures are higher (10–15%) because a proportion of children grow out of it and become symptom free by adulthood. This equates to 5.4 million people receiving asthma treatment.

Asthma is a chronic inflammatory condition of the airways characterised by coughing, wheezing, chest tightness and shortness of breath. Typically, these symptoms tend to be variable, intermittent, worse at night and provoked by triggers (e.g., allergens, infections, irritant exposure). In addition, possible risk factors associated with the development of asthma include a family or personal history of atopy. Asthma can also present as 'cough-variant asthma', in which cough is the predominant symptom, with little or no dyspnoea.

Chronic obstructive pulmonary disease

As of 2022, there were an estimated 1.4 million people affected by COPD, which accounts for approximately 30 000 deaths each year. The prevalence of COPD increases with age and historically was more common in males but now affects the sexes equally. COPD, besides chronic productive cough, is characterised by breathlessness that progressively worsens over time. Other symptoms include wheeze, reduced exercise tolerance and fatigue. People with COPD experience frequent respiratory tract infections. Patients often do not notice early symptoms, or they adjust their lifestyle to make breathing easier. Most people with COPD are current or former smokers (90%), although a small proportion have occupational exposure to chemicals and dust.

Confirmation of the diagnosis is by spirometry testing. Patients with established COPD often experience acute exacerbations marked by a reduction in activities and more pronounced breathlessness. In such cases, the patient requires referral to the GP for potential antibiotics and steroid therapy.

COVID-19

COVID-19 presents with a wide range of symptoms but the most common presentations include a new continuous dry cough, high temperature and a loss or change to sense of smell or taste. Other symptoms that can be experienced include shortness of breath, tiredness, sore throat, headache, nasal congestion, GI disturbances and loss of appetite.

Laryngotracheobronchitis (croup)

Symptoms occur in the late evening and night. The cough can be severe and violent and is described as having a barking (seal-like) quality. In between coughing episodes, the child may be breathless and struggle to breathe properly. For more information on croup and its differential diagnosis, please refer to Chapter 11.

Pneumonia (community acquired)

Every year, between 0.5% and 1% of adults in the United Kingdom have community-acquired pneumonia. Bacterial infection is usually responsible for pneumonia and is mostly caused by *S. pneumoniae* (80% of cases), although other pathogens are also responsible (e.g., *Chlamydia* spp., *Mycoplasma* spp.). Symptoms are typically sudden in onset, usually over 24 to 48 hours. Cough is the predominant symptom. Initially, the cough is nonproductive and painful (first 24–48 hours), but it rapidly becomes productive, with sputum being stained red. The intensity of the redness varies, depending on the causative organism. Accompanying symptoms include fever, breathlessness, general malaise, sweating, pleuritic pain and tachycardia. The person will be obviously unwell. Other less common symptoms include headache, fatigue and wheeze. Older patients are often afebrile and may present with confusion. Examination will show abnormal breath sounds and tachycardia. A CRB-65 score (confusion, respiratory rate, blood pressure) should be established to assess mortality risk. Self-care measures include rest, adequate fluid intake and simple analgesia. Based on clinical judgement and a CRB-65 score of zero, amoxicillin 500 mg tds should be prescribed.

Vocal cord dysfunction

Vocal cord dysfunction occurs when the vocal cords intermittently malfunction and close when the person inhales, reducing the space available for air to move in and out. It is most common in people aged 20 to 40 years old, especially females. Symptoms can mimic asthma. Other symptoms include stridor, hoarseness, feeling of choking and frequent clearing of the throat. Symptoms can be triggered, for example by irritants, temperature changes, odours and exercise.

Very unlikely causes

Bronchiectasis

Bronchiectasis is caused by irreversible dilatation of the bronchi, often brought on by a previous lower respiratory tract infection. It might be underdiagnosed because some people with bronchiectasis are often thought to have COPD. It appears to be more common in females, and the prevalence increases with age. Characteristically, the patient has a chronic cough of very long duration. More than 75% of patients cough daily, producing large volumes of sputum (that can be bloody). Breathlessness is a common accompanying symptom. Other symptoms that may be seen include wheezing, chest pain. fever, fatigue and weight loss.

Carcinoma of the lung

Lung cancer is the third most common cancer in the United Kingdom, with almost 50 000 new cases each year, and it is strongly related to increasing age. In early disease expression, it has many overlapping signs and symptoms similar to other respiratory conditions. However, suspicion should be raised in people older than 40 years of age with a new unexplained cough (which may exhibit haemoptysis), especially if they have a smoking history. They may also experience breathlessness, chest pain, loss of appetite, fatigue and loss of weight. If a person older than 40 years has two or more of these symptoms or if they have ever smoked and have one of these symptoms, then they need to be referred.

Gastro-oesophageal reflux disease

Gastro-oesophageal reflux disease (GORD) does not usually present with cough, but patients might cough when recumbent (lying down). The patient might show symptoms of reflux or heartburn. Patients with GORD have increased cough reflex sensitivity and respond well to proton pump inhibitors. GORD should always be considered in cases of unexplained cough.

Heart failure

Heart failure is a condition of older adults. The prevalence of heart failure rises with increasing age; it is rare in those younger than 65 years but thereafter increases rapidly with increasing age, affecting one in seven people older than 85 years. Heart failure is characterised by an insidious progression; diagnosing early mild heart failure is extremely difficult because symptoms are not pronounced and are nonspecific. Often, the first symptoms patients experience are fatigue, shortness of breath, orthopnoea and dyspnoea at night. As the condition progresses from mild to moderate to severe heart failure, patients show ankle swelling and might complain of a productive frothy cough, which may have pink-tinged sputum and may worsen at night.

Lung abscess

A lung abscess is a localised collection of pus within the lung that leads to the formation of a cavity. Symptoms are often insidious in onset. A typical presentation is initially a nonproductive cough with pleuritic pain and dyspnoea, with signs of infection such as malaise and fever. Later the cough produces large amounts of purulent and often foul-smelling sputum. Fatigue, night sweats and weight loss can also be observed. It is more common in older adults.

Pulmonary embolism

Predominant symptoms are dyspnoea, pleuritic chest pain, fever and leg pain or swelling. Cough can also be present with haemoptysis. There are a number of well-known risk factors such as increasing age, active cancer, recent surgery and trauma.

Spontaneous pneumothorax (collapsed lung)

Rupture of the bullae (the small air- or fluid-filled sacs in the lung) can cause spontaneous pneumothorax, but normally there is no underlying cause. It is most common in young males. Smoking is the most important risk factor, although approximately 10% of patients have a family history of the disease. Key presenting symptoms are sharp unilateral pleuritic pain, shortness of breath and cough. The patient is likely to show signs of distress. The severity of symptoms depends on the extent of lung collapse. If small the leak often heals itself, but if larger the excess air will need to be removed, and onward referral to hospital is required.

Tuberculosis

Tuberculosis (TB) is a bacterial infection caused by *Mycobacterium tuberculosis* that is transmitted primarily by inhalation. In 2021, English figures showed there were 4425 notified cases. People born outside the United Kingdom represent 75% of cases, and TB remains concentrated in the most deprived populations. As in previous years, London accounted for the highest proportion of cases (35%) followed by the West Midlands area (21%).

TB is characterised by its slow onset and initial mild symptoms but should be considered in those at high risk and have symptoms of fever, weight loss, night sweats, anorexia or malaise. Cough associated with TB is chronic in nature, and sputum production can vary from mild to severe, with associated haemoptysis, although this feature tends to be late in symptom presentation.

Nocardiosis, sarcoidosis and psychogenic cough

Although very unlikely that a pharmacist will ever encounter these conditions, they are included here for the sake of completeness. Nocardiosis is an extremely rare bacterial infection caused by *Nocardia asteroides*. It has a higher incidence in older adults, especially in males. The sputum is purulent, thick and possibly blood tinged. Fever is prominent, and night sweats, pleurisy, weight loss and fatigue might also be present. Sarcoidosis is a rare multisystem inflammatory disease usually affecting people younger than the age of 50 years. Any organ system can be involved but most commonly the lungs. Nonspecific symptoms such as fatigue, weight loss, fever and night sweats can be experienced. Lung-specific symptoms include dyspnoea, dry cough and sometimes wheeze. If no organic cause of cough can be found, psychogenic cough should be considered. In such cases, cough is absent at night. In children, it is associated with attention seeking‘ and in adults, it is linked to anxiety disorders.

Table 3.3 summarises the signs and symptoms of conditions causing cough. Fig. 3.1 aids in the differentiation between serious and nonserious conditions of cough in adults.

Red flags indicative of referral: Cough

Reason for referral	Why referring	Timeframe for referral
• Chest pain • Haemoptysis • Pain on inspiration • Wheezing or shortness of breath	• All symptoms suggest a possible sinister pathology or severe cases of simple viral infection	• Urgent same-day referral; depending on severity, may mean referring to hospital rather than GP
• Duration >3 weeks • Cough that recurs on a regular basis	• Likely to be chronic, e.g., post-COVID cough, asthma, UACS, bronchiectasis	• As soon as practicable
• Persistent nocturnal cough in children	• Suggests possible asthma	
• Appetite loss or unexplained weight loss	• Suggests possible TB, cancer, nocardiosis, sarcoidosis	
• Debilitating symptoms in older adults	• This patient group is at greater risk of complications	• Urgent same-day referral

GP, General practitioner; *TB,* tuberculosis; *UACS,* upper airway cough syndrome.

Evidence base for over-the-counter medication

All active ingredients to treat patients with cough were brought to the market many years ago when clinical trials suffered from flaws in study design compared with today's standards; thus, their clinical efficacy is difficult to establish. Compounding these problems is the self-limiting nature of acute cough, which further hinders the differentiation between clinical efficacy and normal symptom resolution. However, there is growing evidence of the lack of demonstrable efficacy and potential safety concerns. In 2014, a Cochrane review examining the treatment of acute cough in both adults and children concluded there was no good evidence to support the effectiveness of cough medicines in acute cough (Smith et al., 2014). Based on the lack of efficacy and potential harm, the Medicines and Healthcare products Regulatory Agency (MHRA) advised (April 2015) healthcare professionals to restrict prescribing or dispensing codeine containing medicines for cough or cold to people older than the age of 12 years. Most manufacturers then reformulated their products, especially those aimed at children, to contain glycerol-based ingredients, limiting preparations containing cough suppressants to mainly pholcodine and dextromethorphan. However, in March 2023, the MHRA announced the withdrawal of pholcodine from the UK market. This means (as of spring 2024) that treatment of nonproductive cough is now limited to dextromethorphan.

Cough suppressant: Dextromethorphan

Trial data for dextromethorphan, like those for codeine and pholcodine, are limited. The Cochrane review of cough mixtures (Smith et al., 2014) identified three studies comparing dextromethorphan with placebo in adults. Two studies found an improvement in cough counts and cough effort, which in one study equated to a

Table 3.3
Summary of cough signs and symptoms

	Acute or chronic	Sputum production	Sputum colour	Age	Systemic symptoms	Periodicity	Other notable symptoms
Acute bronchitis	Acute	Sometimes	White to green-yellow	Adults	Yes	No	Wheeze
Asthma	Chronic	Sometimes	Yellow	Any	No	Night	Wheeze
Bronchiectasis	Chronic	Yes	Mucopurulent	Older adults	Yes (fever)	Morning and night	Fatigue
COPD	Chronic	Yes	Mucopurulent	Older than 40 years	No	Morning	Breathlessness
Cancer	Chronic	Yes	Dark red	Older than 50 years	No	No	Breathlessness
COVID-19	Acute	No	N/A	Any	Yes	No	Loss of taste and smell
Croup	Acute	No	N/A	Young children	Yes	Night	None
GORD	Chronic	No	N/A	Adults	No	No	No
Heart failure	Chronic	Yes	Pink tinged	Older adults	No	Night	Breathlessness, fluid retention
Lung abscess	Chronic	Initially no but latterly yes	Mucopurulent	Older adults	Yes	No	Chest pain, breathlessness
Medication (ACE inhibitors)	Acute but can develop with long-term use	No	N/A	Adults	No	No	None
Nocardiasis	Chronic	Yes	Mucopurulent	Older adults	Yes	No	Breathlessness, fatigue, weight loss
Pneumonia	Acute	Yes	Rust tinged	Older than 50 years	Yes	No	Breathlessness, chest pain
Pneumothorax	Acute	No	N/A	Young adults	No	No	Breathlessness, chest pain
Pulmonary embolism	Acute	Possibly	Blood present	Adults	Possibly (fever)	No	Dyspnoea, chest pain
Sarcoidosis	Chronic	No	N/A	Adults	Yes	No	Breathlessness, fatigue, weight loss
TB	Chronic	Yes	Blood present	Any	Yes	No	Night sweats, weight loss
UACS	Acute but can become chronic	No	N/A	Adults	No	No	Nasal congestion
Viral infection	Acute	Sometimes	White to green-yellow	Any	Yes	Night	Cold symptoms
Vocal cord dysfunction	Acute but can become chronic	No	N/A	Adults	No	No	Shortness of breath and throat clearing

ACE, Angiotensin-converting enzyme; *COPD,* chronic obstructive pulmonary disease; *GORD,* gastro-oesophageal reflux disease; *N/A,* not applicable; *TB,* tuberculosis; *UACS,* upper airway cough syndrome.

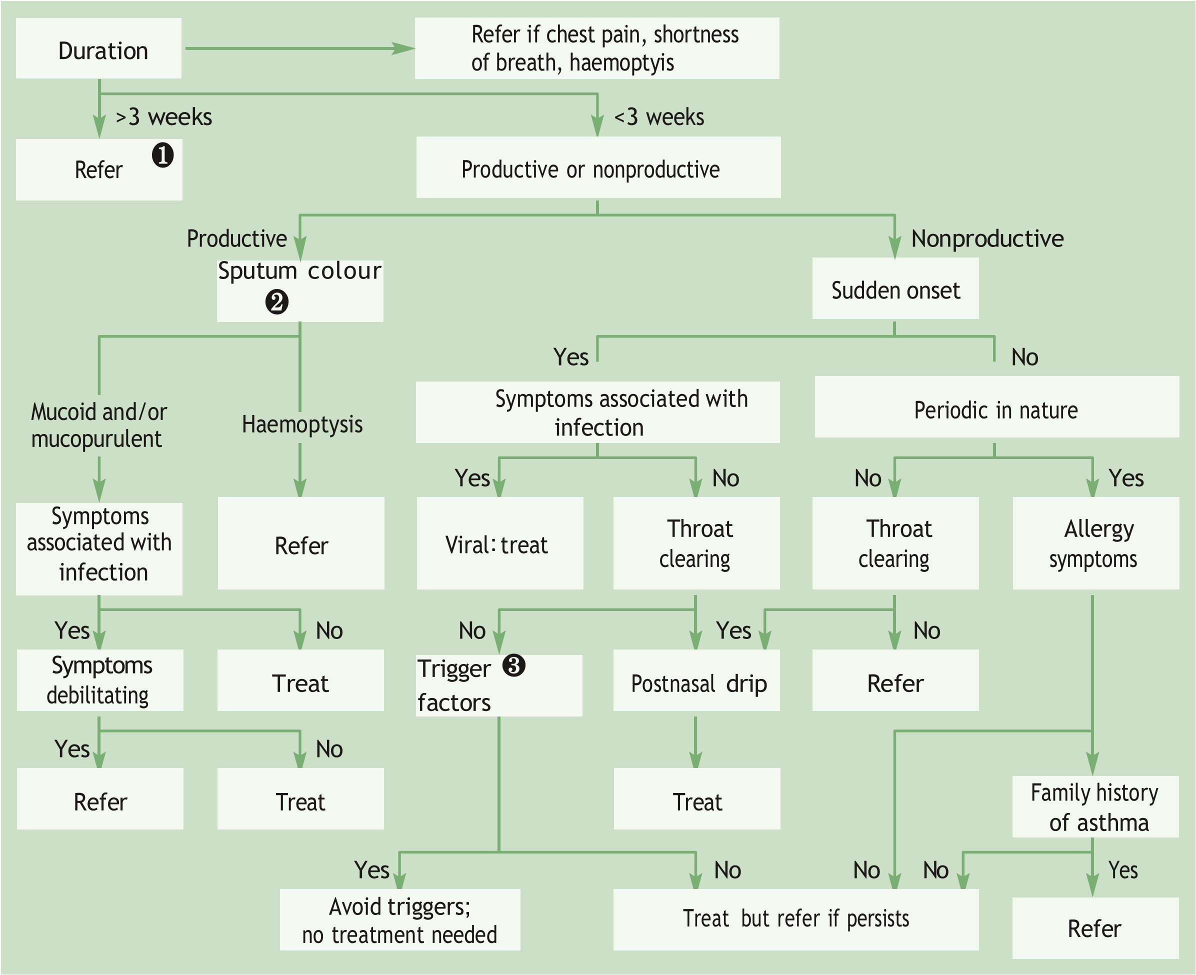
Duration
Refer if chest pain, shortness of breath, haemoptyis
>3 weeks
<3 weeks
Refer ❶
Productive or nonproductive
Productive
Nonproductive
Sputum colour ❷
Sudden onset
Yes
No
Mucoid and/or mucopurulent
Haemoptysis
Symptoms associated with infection
Periodic in nature
Yes
No
No
Yes
Symptoms associated with infection
Refer
Viral: treat
Throat clearing
Throat clearing
Allergy symptoms
Yes
No
No
Yes
No
Symptoms debilitating
Treat
Trigger ❸ factors
Postnasal drip
Refer
Yes
No
Refer
Treat
Treat
Family history of asthma
Yes
No
No
No
Yes
Avoid triggers; no treatment needed
Treat but refer if persists
Refer

Fig. 3.1 Primer for differential diagnosis of cough in adults.

❶ Duration of cough. Coughs lasting longer than 3 weeks are considered not to be acute in nature; conditions with sinister pathology are more likely the longer the cough has been present. However, not all coughs that have lasted 3 weeks have to be referred automatically. For example, upper airway cough syndrome can persist for weeks and be managed by community pharmacists.

❷ Sputum colour. Sputum colour can be helpful in deciding when to refer. However, there is a common misconception that patients who present with green-yellow or brown sputum have a bacterial infection; this is not the case because almost all of these cases are viral in origin. If the cough has persisted for more than 2 weeks, it is possible that an initial viral infection has become secondarily infected with a bacterial infection. This could indicate referral, especially if the symptoms are debilitating or if the patient is an older adult.

❸ Trigger factors. Certain atmospheric factors can trigger cough. These factors include air temperature changes, pollution (e.g., cigarette smoke) and dry atmospheres (e.g., air conditioning).

difference of up to 8 to 10 coughing bouts every 30 minutes. The third study found no difference between dextromethorphan and placebo in terms of cough frequency and subjective cough scores. Dextromethorphan appears to have limited abuse potential and fewer side effects than codeine.

Expectorants

A number of active ingredients have been formulated to help expectoration, including guaifenesin, ammonium salts, ipecacuanha, creosote and squill. Almost all products marketed in the United Kingdom for productive cough contain guaifenesin, although products containing squill (e.g., Buttercup Original Cough Syrup, Covonia Chesty Cough Mixture Mentholated) are available.

Older ingredients, such as ammonium salts, ipecacuanha and squill, were traditionally used to induce vomiting, and it was believed that at subemetic doses, they would cause gastric irritation, triggering reflex expectoration, but this has never been proven.

Guaifenesin is thought to stimulate secretion of respiratory tract fluid, increasing sputum volume and decreasing viscosity, thus assisting in the removal of sputum. Guaifenesin is the only active ingredient that has any evidence of effectiveness. Three studies identified by Smith et al. (2014) in their systematic review found conflicting results for guaifenesin as an expectorant. In the largest study ($n = 239$), participants stated that guaifenesin significantly reduced cough frequency and intensity compared with placebo. In a smaller trial ($n = 65$), guaifenesin was found to have no effect on cough frequency or severity compared with placebo.

A more recent study comparing extended-release guaifenesin with placebo ($n = 378$) found no difference in spontaneous symptom severity scores on day 7 but found a reduction from baseline in scores on day 4 (7.1 vs 5.7; $P = .04$). The clinical significance of this difference is uncertain.

Based on these studies, guaifenesin is probably little or no better than placebo. However, given its proven safety record, absence of drug interactions and the public's desire to treat productive coughs with a home remedy, it would seem reasonable to supply over-the-counter (OTC) expectorants containing guaifenesin.

Antihistamines

Antihistamines have been included in cough remedies for decades. Their mechanism of action is thought to be through the anticholinergic-like drying action on the mucous membranes and not via histamine. There have been numerous clinical trials involving antihistamines for the relief of cough and cold symptoms, most notably with diphenhydramine.

Citric acid–induced cough studies have demonstrated significant antitussive activity compared with placebo, and results from chronic cough trials support an antitussive activity for diphenhydramine. However, trials that showed a significant reduction in cough frequency suffered from having small patient numbers, thus limiting their usefulness. Additionally, poor methodologic design of trials investigating the antitussive activity of diphenhydramine in acute cough makes assessment of its effectiveness difficult. One review concluded that 'Presumptions about efficacy of diphenhydramine against cough in humans are not unequivocally substantiated in literature' (Bjornsdottir et al., 2007). Less sedating antihistamines have also not been shown to have any benefit in treating coughs compared with placebo (Smith et al., 2014).

Demulcents

Demulcents, such as simple linctus and honey, are pharmacologically inert and are used on the theoretical basis that they reduce irritation by coating the pharynx and thus prevent coughing. However, there is no evidence for their efficacy, and they are used mainly for their placebo effect. A Cochrane review explored the evidence for the use of honey in acute cough in children (Oduwole et al., 2018). The review included six trials involving 899 children. The review found moderate- to low-quality evidence that honey was probably more effective than no treatment or placebo, and giving honey for up to 3 days is probably more effective in relieving the duration of cough symptoms compared with placebo.

Combination cough mixtures

Many OTC cough preparations are combinations of agents. Some of these include ingredients, such as decongestants. It should be noted that some combination products contain subtherapeutic doses of the active ingredients, and a few contain illogical combinations such as cough suppressants with an expectorant or an antihistamine with an expectorant. If possible, combination products should be avoided.

Herbal products

A number of herbal ingredients are included in cough medicines, for example, *Pelargonium sidoides* (geranium), echinacea, *Andrographis paniculata* (green chiretta), ivy, primrose and thyme (Wagner et al., 2015). In Wagner and colleagues' review, very low-quality evidence was found that ivy, primrose or thyme significantly reduced cough compared with placebo in people with acute cough. Commercially, in the United Kingdom, thyme is included in a number of products (e.g., Bronchostop), but based on this evidence, it should not be routinely recommended.

Summary

Evidence for any ingredient to treat productive or nonproductive cough is limited. Simple self-care measures of keeping well hydrated and the use of demulcents are most appropriate.

Practical prescribing and product selection

Prescribing information relating to the cough medicines reviewed in the section 'Evidence base for over-the-counter medication' is discussed and summarised in Table 3.4; useful tips relating to patients presenting with cough are given in 'Hints and tips' in Box 3.1.

Guaifenesin

Adults and children 12 years and older should take 200 mg (10 mL) four times a day; in products licensed for children, the dosage is 100 mg four times a day. Guaifenesin-based products have no cautions in their use and no side effects; they are also free from clinically significant drug interactions. Sugar-free versions (e.g., Robitussin products) are available.

Dextromethorphan

Given it is an opiate derivative, dextromethorphan can interact with prescription-only medications and OTC medications, especially those that cross the blood–brain barrier. Their combined effect is to potentiate sedation, and it is important to warn patients of this, although short-term use is unlikely to warrant dosage modification. Dextromethorphan may also increase the risk of serotonin syndrome if given with other drugs that contribute to serotonin syndrome, such as monoamine oxidase inhibitors (MAOIs), selective serotonin reuptake inhibitors and tramadol. Care should be exercised when given to asthmatics because, in theory, respiratory depression can occur.

For adults and children aged older than 12 years, a number of products are available (e.g., Benylin dry coughs, Covonia Original Bronchial Balsam, Robitussin Dry Cough medicine). The dosing for these listed products is standard, 10 mL four times a day.

Table 3.4
Practical prescribing: Summary of cough medicines

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Cough expectorant					
Guaifenesin	Older than 6 years	None	None	None	OK
Cough suppressants					
Dextromethorphan	Older than 12 years[a]	Possible sedation	Increased sedation with alcohol, opioid analgesics, anxiolytics, hypnotics, antidepressants	Asthma	Pregnancy: best avoided in the third trimester; short periods OK in breastfeeding; reports of dextromethorphan causing drowsiness and poor feeding in babies
Antihistamines					
Diphenhydramine	Older than 6 years	Dry mouth, sedation, dizziness, headache, nausea constipation	Increased sedation with alcohol, opioid analgesics, anxiolytics, hypnotics, antidepressants	Glaucoma, prostate enlargement	Pregnancy: standard references state OK, although some manufacturers advise avoidance; breastfeeding OK because amount secreted into breast milk is small; however, it may reduce milk supply; reports of poor feeding in babies
Demulcent					
Simple linctus	Older than 1 month	None	None	None	OK

[a] Not recommended for adolescents (aged 12–18 years) who have problems with breathing.

HINTS AND TIPS BOX 3.1: COUGH

Infection and insulin-dependent diabetes	• People with insulin-dependent diabetes should be asked to monitor their blood glucose levels more frequently because insulin requirements increase during acute infections.
Avoid theophylline	• Theophylline is available as a pharmacy-only medicine, but it is best avoided because patients with shortness of breath or wheeze need further assessment.

Antihistamines

The routine use of antihistamines is unjustified in treating patients with nonproductive cough. However, the sedative side effects from antihistamines can, on occasion, be useful to allow a patient an uninterrupted night's sleep. Antihistamines can interact with other sedating medications, resulting in potentiation of the sedative properties of the interacting medicines. They also possess antimuscarinic side effects, which commonly result in dry mouth and possibly constipation. Because of these antimuscarinic properties, patients with glaucoma and prostate enlargement should ideally avoid their use because it could lead to increased intraocular pressure and precipitation of urinary retention.

Demulcents

Demulcents provide a safe alternative for at-risk patient groups, such as older adults, pregnant females, young children and those taking multiple medications. They can act as useful placebos when the patient insists on a cough mixture. If recommended, they should be given three or four times a day.

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UK Lung cancer coalition: https://www.uklcc.org.uk/

Validity of British Thoracic Society guidance (the CRB-65 rule) for predicting the severity of pneumonia in general practice: systematic review and meta-analysis: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2944951/

The common cold

Background

Colds, along with coughs, represent the largest caseload for primary healthcare workers. Because the condition has no specific cure and is self-limiting, with two-thirds of patients recovering within 1 week, it would be easy to dismiss the condition as unimportant. However, because of the very high number of cases seen, it is essential that pharmacists have a thorough understanding of the condition so that debilitating symptoms or symptoms suggestive of COVID-19 or influenza are identified.

Prevalence and epidemiology

The common cold is extremely prevalent. Children contract colds more frequently than adults, with on average 5 to 6 colds per year compared with 2 to 3 colds in adults, although in children, this can be as high as 12 colds per year. Children between 4 and 8 years of age are most likely to contract a cold, and it can appear to a child's parents that one cold follow another, with no respite. By the age of 10 years, the number of colds contracted is half that observed in preschool children. In the United Kingdom, colds peak in December and January, possibly because of increased crowding indoors during cold weather.

Aetiology

More than 200 subtypes of viruses can produce symptoms of the common cold, including rhinoviruses (accounting for 30–50% of all cases), coronaviruses, parainfluenza virus, respiratory syncytial virus and adenovirus. Transmission is primarily by the virus coming into contact with the hands, which then touch the nose, mouth and eyes (direct contact transmission). Droplets shed from the nose coat surfaces such as door handles and telephones. Cold viruses can remain viable on these surfaces for several hours, and when an uninfected person touches the contaminated surface, transmission occurs.

Transmission by coughing and sneezing does occur, although it is a secondary mechanism. This is why good hygiene (washing hands frequently and using disposable tissues) remains the cornerstone of reducing the spread of colds.

When a virus is exposed to the mucosa, it invades the nasal and bronchial epithelia, attaching to specific receptors and causing damage to the ciliated cells. This results in the release of inflammatory mediators, which in turn leads to inflammation of the tissues lining the nose. Permeability of capillary cell walls increases, resulting in oedema, which is experienced by the patient as nasal congestion and sneezing. Fluid might drip down the back of the throat, spreading the virus to the throat and upper chest, causing cough and sore throat. Colds are most contagious during the first 1 to 2 days of symptoms.

Arriving at a differential diagnosis

Most people can accurately self-diagnose a common cold, and it is the pharmacist's role to confirm this self-diagnosis and assess the severity of the symptoms because some patients (e.g., older adults, infirm and those with existing medical conditions) might need greater support and care. Anyone with debilitating symptoms that effectively prevent them from doing normal daily routines should be managed more carefully. It is extremely likely that someone presenting with cold symptoms will have a viral infection, but other conditions have overlapping symptoms and need to be considered (Table 3.5). Asking symptom-specific questions helps to establish a differential diagnosis (Table 3.6).

Table 3.5
Causes of coldlike symptoms and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Viral infection
Likely	• Allergic rhinitis • COVID-19
Unlikely	• Influenza • Complications ○ Otitis media ○ Rhinosinusitis
Very unlikely	• Meningitis

Table 3.6
Specific questions to ask the patient: The common cold

Question	Relevance
Appearance of symptoms	• Peak incidence of flu is in the winter months; the common cold occurs any time throughout the year. • Flu symptoms tend to have a more abrupt onset than the common cold—a matter of hours rather than 1 or 2 days. • Summer colds are common, but they must be differentiated from seasonal allergic rhinitis.
Nature of symptoms	• Marked constitutional symptoms are more prominent in flu than in COVID or the common cold. • Nasal symptoms and sneezing are more prominent in the common cold.
Associated symptoms	• Headache and pain that is worsened by sneezing, coughing and bending over suggests sinus complications. • Ear pain, especially in children, suggests middle ear involvement.

Clinical features of the common cold

Symptoms of the common cold are well known. However, the nature and severity of symptoms are influenced by factors such as the causative agent, patient age and underlying medical conditions. After an incubation period of between 1 and 3 days (although this can be as short as 10–12 hours), the patient develops a sore throat and sneezing followed closely by nasal discharge and congestion. The sore throat usually resolves quickly, and by the second to third days of illness, nasal symptoms predominate. A cough can develop (~30% of people) typically after nasal symptoms have cleared. Systemic symptoms are uncommon, but people can experience headache, mild to moderate fever and general malaise. Most colds resolve in 1 week, but up to 25% of people have symptoms lasting 14 days or more.

Conditions to eliminate

Likely causes

Allergic rhinitis

This can present with a similar symptom complex to the common cold exhibiting rhinorrhoea and nasal congestion, sneezing and cough. However, it is usual to experience nasal or conjunctival itching or redness. A family history of atopy is often present, and symptoms also tend to be more longstanding. Rhinitis is covered in more detail later in this chapter, and readers are referred to that section for further information.

COVID-19

COVID-19 presents with a wide range of symptoms, but the most common presentations include a new continuous dry cough, high temperature and a loss or change to sense of smell or taste. Other symptoms that can be experienced include shortness of breath, tiredness, sore throat, headache, nasal congestion, GI disturbances and loss of appetite.

Unlikely causes

Influenza

The onset of influenza is sudden (within a few hours), and typical symptoms include coldlike symptoms; fever; a nonproductive cough; and generalised symptoms such as shivering, chills, malaise, marked aching of limbs, insomnia, fatigue and loss of appetite. Influenza is therefore normally debilitating, and a person with flu is much more likely to send a third party into a pharmacy for medication than present in person. Symptoms improve after approximately 5 days, with resolution after 1 week or more.

Table 3.7 summarises the signs and symptoms of the common cold, COVID-19 and flu.

Very unlikely causes

Meningitis

In the early stages of the disease, signs and symptoms are nonspecific and are similar to those of cold and flu. Symptoms can develop quickly, in a matter of hours, and can be unpredictable, especially in infants and young children. Symptoms of fever, lethargy, vomiting and irritability are common in children aged between 3 months and 2 years. In infants, floppiness and a dislike of being handled are also common features. Symptoms more common in older children include severe headache, stiff neck and photophobia. A

Table 3.7
Condition summary for the common cold, flu and COVID

Symptoms	COVID-19	Flu	Cold
Sore throat	Sometimes	Sometimes	Common
Cough	Common	Common	~30% of patients
Rhinorrhoea or nasal congestion	Rare	Sometimes	Common
Fatigue	Sometimes	Common	Rare
Fever	Common	Common	Rare
Headaches	Sometimes	Common	Rare
Loss of taste or smell	Common	Rare	Rare
Sneezing	No	No	Common
Gastrointestinal symptoms	Sometimes	Sometimes	No

petechial or purpuric nonblanching rash may develop in the latter stages of the disease.

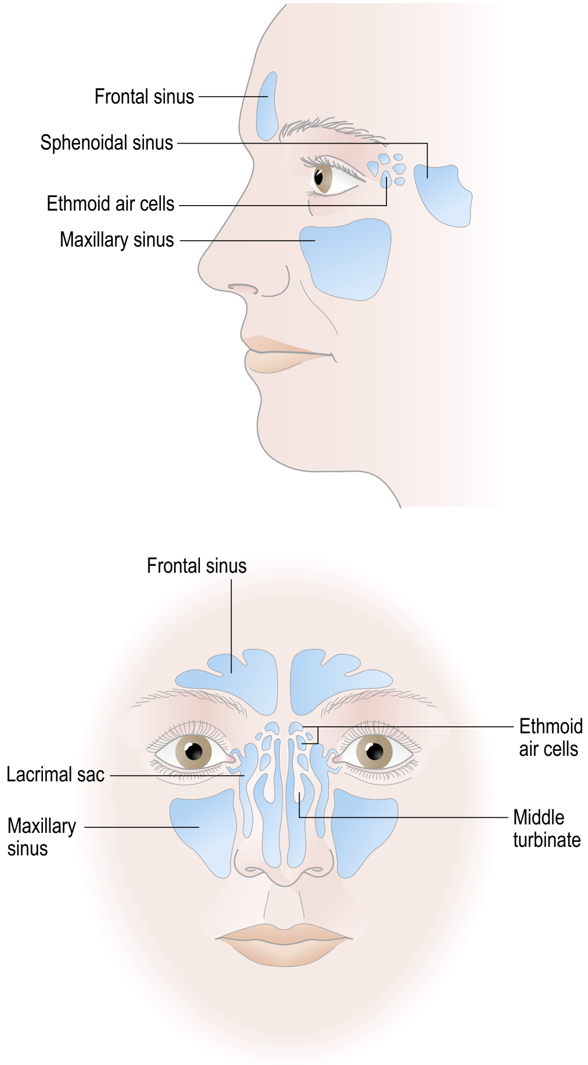

Fig. 3.2 Location of the sinuses.

Complications

Acute rhinosinusitis

Rhinosinusitis (formerly referred to as sinusitis) is an inflammation of one or more of the paranasal sinuses. Up to 2% of patients develop acute rhinosinusitis as a complication of the common cold. Anatomically, the sinuses are described in four pairs: frontal sinuses, ethmoid sinuses, maxillary sinuses and sphenoid sinuses (Fig. 3.2). All are air-filled spaces that drain into the nasal cavity. After a cold, sinus air spaces can become filled with nasal secretions, which stagnate because of a reduction in ciliary function of the cells lining the sinuses. Bacteria, commonly *Streptococcus* and *Haemophilus* spp., can then secondarily infect these stagnant secretions.

Rhinosinusitis can affect any age group, although it is more common in adults**.** Symptoms that are highly suggestive of sinusitis are nasal obstruction and discharge, as well as facial pain. The pain in the early stages tends to be relatively mild and localised, usually unilateral and dull but becomes bilateral and more severe the longer the condition persists. Bending forward often exacerbates the pain (moving the eyes from side to side and coughing or sneezing can also increase the pain), and the sinuses are tender when gently palpated. If the ethmoid sinuses are involved, retro-orbital pain (behind the eye) is often experienced. Other symptoms include frontal headache, fever and loss of smell.

Symptoms usually resolve in 2 to 3 weeks, and self-care measures such as simple analgesia and oral or nasal sympathomimetics can be tried to relieve symptoms. Antibiotics are not routinely recommended (National Institute for Health and Care Excellence [NICE], 2017) unless the person is systemically unwell, at risk of complications because of underlying medical conditions or has had symptoms for at least 10 days. If antibiotics are to be prescribed, then phenoxymethylpenicillin or co-amoxiclav (amoxicillin–clavulanic acid) are first-line agents (doxycycline or clarithromycin if the patient has a penicillin allergy). In the United Kingdom, patient group directions (as in Pharmacy First) allow the supply of penicillin, macrolides, doxycycline and steroid nasal sprays to those older than the age of 12 years.

Acute otitis media

Acute otitis media is commonly seen in children up to the age of 4 years after a common cold and results from the virus spreading to the middle ear via the Eustachian tube, where an accumulation of pus in the middle ear or inflammation of the tympanic membrane (eardrum) results. Symptoms develop rapidly. Young children often hold or rub their ear or have nonspecific symptoms such as fever, crying, poor feeding and restlessness. In older children, ear pain or earache is the predominant feature and tends to be throbbing. An examination of the ear should reveal a red-yellow and bulging tympanic membrane with a loss of normal landmarks. Please refer to the earache section in Chapter 5 for further information on otitis media and its differentiation from other similar conditions.

Red flags indicative of referral: The common cold

Reason for referral	Why referring	Timeframe for referral
- Failure to respond to OTC medicines	- Reassessment of symptoms to check for possible misdiagnosis or development of complications	- As soon as practicable
- Middle ear pain that fails to respond to analgesia if not issuing antibiotics under a patient group direction	- Possible need for antibiotics	
- Patients with symptoms indicative of flu - Vulnerable patient groups, such as very old patients who exhibit constitutional symptoms	- Potentially require greater levels of support and monitoring other than self-care intervention	- Same-day referral

OTC, Over-the-counter.

Evidence base for over-the-counter medication

Many of the active ingredients found in cold remedies are also constituents of cough products. Often, they are combined and marketed as cough and cold or flu remedies. For information relating to cough ingredients, readers are referred to the sections on OTC medication for coughs.

Antihistamines

A Cochrane review (De Sutter et al., 2015) found that in adults, there was a short-term beneficial effect on severity of overall symptoms on the first or second day of treatment (45% felt better vs 38% with placebo), but there was no difference between antihistamines and placebo in the mid to long terms. The effect of sedating antihistamines on rhinorrhoea and sneezing was too small to be relevant to the patient, and sedative side effects were higher (9% vs 5.2% with placebo). Trials in children lacked evidence of effectiveness.

Sympathomimetics

Trial data specifically looking at the effects of decongestants in the common cold are limited. A Cochrane review (Deckx et al., 2016) identified 15 trials that involved topical oxymetazoline and oral pseudoephedrine and phenylpropanolamine (no longer used in the United Kingdom). The authors found a small but significant improvement in symptoms of nasal congestion in adults. However, the studies were generally of low quality, and there were insufficient data to compare oral and topical treatment. Also, data were lacking in children younger than 12 years.

A systematic review of single-dose phenylephrine studies found a statistically significant improvement in nasal airway resistance at 60 minutes compared with placebo (Kollar et al., 2007). However, the studies did not measure clinical outcomes (e.g., subjective improvement in symptoms), and the difference was small (16% at 60 minutes). In addition, four of the eight studies showed no benefit for phenylephrine compared with placebo. A systematic review (Hatton et al., 2007) concluded that there was insufficient evidence for the efficacy of phenylephrine as a nasal decongestant. This was supported by a more recent randomised controlled trial using dosages up to 40 mg every 4 hours that found no significant difference compared with placebo (Meltzer et al., 2015).

Multi-ingredient preparations

There is no shortage of cold and flu remedies marketed. Many combine three or more ingredients. In most cases, the patient does not require all the active ingredients to treat the symptoms. A more sensible approach to medication management is to match the patient's symptoms with active ingredients with known evidence of efficacy. In many cases, this can be achieved by providing the patient with monotherapy or a product containing two active ingredients. Preparations with multiple ingredients, therefore, have a very limited role to play in the management of coughs and colds. However, patients might perceive an all-in-one medicine as better value for their money, so potentially, adherence with such preparations might be improved.

De Sutter et al. (2022) reviewed oral antihistamine–decongestant–analgesic combinations for the common cold. The review involved 27 trials and more than 5000 patients, concluding that current evidence suggests that these combinations have some general benefit in adults and older children, although they had an increased risk of adverse effects.

Anticholinergics

One intranasal preparation in combination with xylometazoline is available on the UK market. A Cochrane review identified seven trials that explored the effect of intranasal ipratropium on the severity of congestion and rhinorrhoea in patients with the common cold (AlBalawi et al., 2013). The review found that four studies showed a statistically significant improvement in the severity of rhinorrhoea, and two that demonstrated a significantly greater global assessment of overall improvement with ipratropium compared with placebo. However, no studies found an improvement in nasal congestion. The authors concluded that ipratropium is likely to be effective in ameliorating rhinorrhoea associated with the common cold.

Alternative therapies

Zinc lozenges

A number of studies have looked at zinc's effect on treating the common cold. A systematic review by Hemilä (2011) identified 13 randomised controlled trials that compared zinc with placebo. The results indicated differences in efficacy depending on the dose and the salt of zinc used. The authors found no significant difference in the duration of colds compared with placebo at dosages less than 75 mg/day. For dosages of more than 75 mg/day using an acetate salt, the investigators found a statistically significant 42% reduction in the duration of colds and a 20% reduction in duration with nonacetate salts. This equated to a 1- to 3-day reduction in the duration of the cold. It should be noted that this systematic review was of low to moderate quality. It seems prudent that until further data are available, zinc should not be recommended to treat the common cold.

Vitamin C

Vitamin C has been widely recommended as a cure for the common cold. However, controversy remains whether it is effective in combating the common cold. A large number of clinical trials have investigated the effect of vitamin C on the prevention and treatment of the common cold.

A Cochrane review examining the role of vitamin C at dosages higher than 200 mg/day in preventing and treating the common cold identified 29 studies involving 11 306 participants (Hemilä et al., 2013). The review found that vitamin C prophylaxis had no effect on the incidence of the common cold in the general community and only a small effect (8% reduction) on the duration of the cold. However, they found a 50% reduction in the incidence of the common cold in people undergoing high physical stress (e.g., marathon runners, skiers and soldiers on subarctic exercises) with the prophylactic use of vitamin C. The review found that the use of vitamin C, after a cold had started, had no consistent effect on the duration or severity of the cold. The authors concluded that routine prophylaxis with vitamin C in the general community is unjustified but could be beneficial to those exposed to brief periods of intense physical exercise.

Echinacea

Several reviews have reported echinacea's effect as being inconsistent. This is in part due to the limited number of trials that are comparable because different echinacea species are used, as well as different plant parts and extraction methods. A Cochrane review has attempted to take these factors into consideration (Karsch-Völk et al., 2014). The authors reviewed 24 trials involving 4631 participants to determine echinacea's effectiveness in preventing and treating the common cold. Overall, they concluded that evidence was weak for echinacea in preventing and treating colds, although there was stronger evidence for its use as a preventive treatment.

Vapour inhalation

Steam inhalation has long been advocated to aid relief of symptoms of the common cold, usually with the addition of menthol crystals. A Cochrane review found (six trials [n = 387], all involving adults) conflicting evidence in symptom relief of the common cold (Singh et al., 2017). However, it is cheap and does not carry any significant risks apart from minor discomfort and irritation of the nose. It appears that steam is the key to symptom resolution and not any additional ingredient that is added to the water.

Saline sprays

A Cochrane review exploring the use of saline irrigation on acute upper respiratory tract infections identified five randomised controlled trials involving 205 adults and 544 children (King et al., 2015). The studies generally found no difference between saline treatment and control, although one study involving children did demonstrate statistically significant reductions in nasal secretion scores. Whether this translates into clinical improvement is uncertain. The authors noted that there were no serious side effects, but saline irrigation could cause minor irritation and discomfort, with up to 40% of babies not tolerating saline nasal drops. In conclusion, it remains unclear if saline irrigation is beneficial.

Garlic

A Cochrane review (Lissiman et al., 2014) identified one trial that randomly assigned 146 participants to a garlic supplement (with 180 mg of allicin content) or a placebo once daily for 12 weeks. The trial relied on self-reported episodes of the common cold and reported 24 occurrences of the common cold in the garlic intervention group compared with 65 in the placebo group ($P < .001$). This single trial suggests that garlic may prevent occurrences of the common cold, but more studies are needed to substantiate these findings.

Summary

Evidence of efficacy for Western and alternative medicines in preventing and treating the common cold is weak. Decongestants used on an as-needed basis probably have the strongest evidence base in relieving symptoms.

Practical prescribing and product selection

Prescribing information relating to OTC cold medicines is discussed and summarised in Table 3.8, and useful tips relating to patients presenting with a cold are given in Hints and Tips Box 3.2.

Table 3.8
Practical prescribing: Summary of cold medicines

Name of medication	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Antihistamines					
Diphenhydramine	Older than 6 years	Dry mouth, sedation, dizziness, headache, nausea constipation	Increased sedation with alcohol, opioid analgesics, anxiolytics, hypnotics, antidepressants	Glaucoma, prostate enlargement	Pregnancy: standard references state OK, although some manufacturers advise avoidance Breastfeeding OK because the amount secreted into breast milk is small; it may, however, reduce the milk supply
Systemic sympathomimetics					
Phenylephrine	Older than 12 years	Insomnia	Avoid MAOIs and moclobemide; avoid in patients taking beta-blockers and TCAs	Control of hypertension and diabetes may be affected, but a short treatment course is unlikely to be clinically important	Best avoided in pregnancy because mild foetal malformations have been reported Breastfeeding OK, but it may reduce the milk supply
Pseudoephedrine	Older than 6 years				
Topical sympathomimetics					
Oxymetazoline	Older than 12 years	Possible local irritation in ~5% of patients	Avoid with MAOIs and moclobemide	None	Pregnancy: not adequately studied; avoid Breastfeeding OK
Xylometazoline (Otrivine Child Nasal Drops)	Older than 6 years				
Ephedrine	Older than 12 years				Avoid
Anticholinergic (ipratropium, xylometazoline)	Older than 18 years	Nosebleeds, nasal irritation, dryness	Avoid with MAOIs and moclobemide	Narrow-angle glaucoma, urinary retention	Manufacturers recommended avoiding

MAOI, Monoamine oxidase inhibitor; *OTC,* over-the-counter; *TCA,* tricyclic antidepressant.

Antihistamines

First-generation antihistamines are now included in relatively few cough and cold remedies. Further information on antihistamines can be found in the cough section.

Sympathomimetics

Sympathomimetics serve to constrict dilated blood vessels and swollen nasal mucosa, easing congestion and helping breathing. Sympathomimetics interact with MAOIs (e.g., phenelzine, isocarboxazid, tranylcypromine, moclobemide), which can result in a fatal hypertensive crisis. The danger of the interaction persists for up to 2 weeks after treatment with MAOIs is discontinued. In addition, systemic sympathomimetics can also increase blood pressure, which might, although unlikely with short courses of treatment, alter control of blood pressure in hypertensive patients and disturb blood glucose control in diabetics. A topical sympathomimetic could be given to such patients to negate this potential issue.

HINTS AND TIPS BOX 3.2: THE COMMON COLD

General self-care measures	• Maintain adequate fluid intake during the illness. • Simple analgesia (paracetamol or ibuprofen) can be given to help with pain and fever.
Limiting viral spread	• Use disposable tissues rather than handkerchiefs. • Wash hands frequently, especially after nose blowing. • Do not share hand towels. • Try to avoid touching your nose.
Stuffy noses in babies	• Saline nose drops can be used from birth to help with congestion. • Vapour rubs may soothe respiratory symptoms in infants and small children.
General sales list of cold remedies	• Products such as Lemsip and Beecham contain paracetamol. It is important to ensure that patients do not take excessive doses of analgesia unknowingly.
Topical decongestants	• Rhinitis medicamentosa relates to the problem of overly long use of topical sympathomimetics. Prolonged use (normally >5–7 days of continuous use) results in vascular engorgement of the nose on withdrawal of the medication. Patients may mistakenly believe that symptoms have returned and begin to use the medication again, thus perpetuating the problem.
Administration of nasal drops	• The best way to administer nose drops is to have the head in the downward position facing the floor. Tilting the head backward and towards the ceiling is incorrect because this facilitates the swallowing of the drops.

The most likely side effects of sympathomimetics are insomnia, restlessness and tachycardia. Patients should be advised not to take a dose just before bedtime because the medication's mild stimulant action can disturb sleep.

Systemic sympathomimetics

Phenylephrine

Phenylephrine is available in a number of proprietary products (e.g., Lemsip, Sudafed, Beecham products) in dosages ranging from 5 to 12 mg, three or four times a day, for adults and children older than the age of 12 years (although some restrict it to those older than 16 years). It is often combined with paracetamol and other ingredients and marketed as a cold and flu remedy.

Pseudoephedrine

Pseudoephedrine is widely available as a single ingredient (e.g., Sudafed Decongestant Tablets) or in multi-ingredient products in cold and cough remedies (e.g., Benylin 4 Flu Tablets). The standard adult dosage is 60 mg three or four times a day, and half the adult dose (30 mg) is suitable for children between 6 and 12 years of age. Some products are only recommended for use in adults and children older than 12 years of age.

Nasal sympathomimetics

Nasal administration of sympathomimetics represents the safest route of administration. They can be given to most patient groups, including pregnant females after the first trimester and patients with preexisting heart disease, diabetes, hypertension and hyperthyroidism. However, a degree of systemic absorption is possible, especially when using drops, because a small quantity might be swallowed; therefore, they should be avoided in patients taking MAOIs.

Ephedrine

Adults and children older than 12 years should put one or two drops into each nostril up to four times daily when required.

Oxymetazoline and xylometazoline

These agents are longer acting than ephedrine and require less frequent dosing, typically two or three times a day. They are made by a number of manufacturers (e.g., Otrivine, Sudafed, Vicks), which all recommend use from 12 years upwards, except Otrivine Child Nasal Drops, which can be given to children older than the age of 6 years (one or two drops into each nostril once or twice daily).

Anticholinergic–decongestant combination

Otrivine Extra Dual Relief Nasal Spray (ipratropium bromide 0.6 mg/mL and xylometazoline hydrochloride 0.5 mg/mL) is licensed for the symptomatic treatment of nasal congestion and rhinorrhoea in connection with common colds in people older than 18 years of age. Dosing is one puff in each nostril three times a day. It should be restricted to a maximum of 7 days of use (presumably because of the potential for rebound effects associated with xylometazoline). Side effects include nasal dryness and nosebleeds. The manufacturer does not recommend use in pregnancy and lactation because of a lack of clinical safety data.

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Sore throat

Background

Any part of the mucosa of the throat can exhibit symptoms of pain. This includes the pharynx (pharyngitis) and tonsils (tonsillitis), yet clinical distinction between pharyngitis and tonsillitis is unclear. Sore throats are often associated with the common cold. However, in this section, people who present with sore throat as the principal symptom are considered.

Prevalence and epidemiology

Sore throats are extremely common with the highest incidence in children in the winter. UK figures show that a GP with 2000 patients will see about 120 people each year with a throat infection. However, four to six times as many people will visit the pharmacy and self-treat. Figures from other countries such as New Zealand and Australia support UK data.

Aetiology

Viral infection accounts for between 70% and 90% of all sore throat cases. Remaining cases are nearly all bacterial, with the most common cause being group A beta-haemolytic *Streptococcus* (also known as *Streptococcus pyogenes*). A fuller account of the viral and bacterial pathogens that affect the upper respiratory tract appears under aetiology of colds.

Arriving at a differential diagnosis

The overwhelming majority of cases will be acute and self-limiting, whether viral or bacterial in origin. Clinically, differentiation between viral and bacterial infection is extremely difficult. NICE recommends two clinical prediction rules (CPRs), FeverPAIN and Centor, to guide decision-making (Table 3.9).

However, other conditions in which sore throat is one of the major presenting symptoms need to be considered (Table 3.10).

Table 3.9
FeverPAIN and Centor scoring criteria for sore throat

FeverPAIN	**Centor**
Fever >38°C	Fever >38°C
Purulence (pharyngeal or tonsillar exudate	Tender anterior cervical lymphadenopathy or lymphadenitis
Attend rapidly (≤3 days)	
Severely inflamed tonsils	Tonsillar exudate
No cough or coryza	Absence of cough

Table 3.10
Causes of sore throat and the likelihood of presentation in community pharmacy

Incidence	**Cause**
Most likely	• Viral infection
Likely	• Streptococcal infection
Unlikely	• COVID-19 • Glandular fever (adolescents) • Herpangina (children) • Herpetic pharyngitis (children) • Influenza • Irritation/trauma • Thrush
Very unlikely	• Carcinoma • Scarlet fever

Table 3.11
Specific questions to ask the patient: Sore throat

Question	Relevance
Age of the patient	- Streptococcus is uncommon those younger than 3 years. Streptococcal infections are more prevalent in those of school age (5–10 years) and young adults (15–25 years)/ - Herpetic pharyngitis and herpangina are seen in children/ - Glandular fever is most prevalent in adolescents. - Carcinoma is seen with increasing age.
Tender cervical glands	- Patients with glandular fever and streptococcal sore throat often have swollen glands.
Ulceration	- Ulcers can also cause sore throat, especially if located in the posterior part of the mouth.

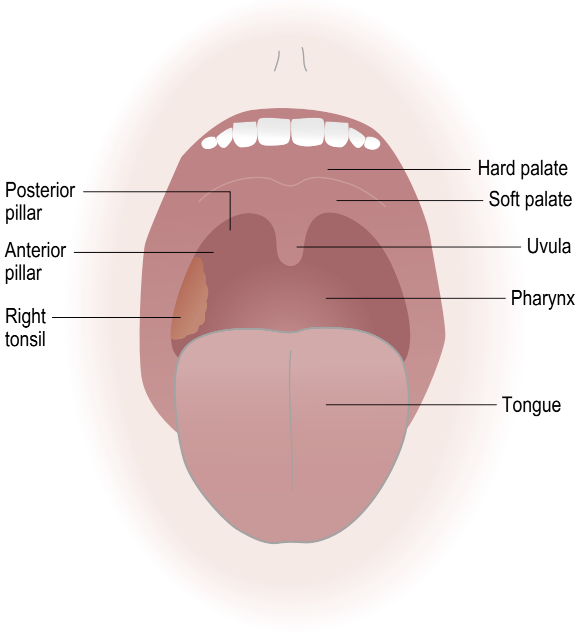

Fig. 3.3 Major structures of the mouth.

Asking symptom-specific questions helps to establish a differential diagnosis (Table 3.11).

Physical examination

After questioning, an inspection of the posterior aspect of the mouth and cervical glands (located just below the angle of the jaw) should be performed (Fig. 3.3). The examination requires a good light source (e.g., pen torch). These steps should be followed:

1. Wash your hands.
2. Explain the examination procedure and gain consent.
3. Get the person seated so the examiner can be at eye level.
4. To examine the palate, uvula and tonsils, ask the person to say ‘ah’. Pay particular attention to the size of the tonsils. Are they red and swollen? Is there any exudate present? Is there any sign of ulceration?
5. Check the posterior wall of the throat. It should appear pink and moist, without exudate or lesions when healthy. Redness or exudate suggests pharyngitis.
6. Explain to the person the examination is finished and thank them.
7. Relate your findings back to the person.
8. Wash your hands.

Clinical features of viral sore throat

Acute pharyngitis is characterised by a rapid onset of sore throat and pharyngeal inflammation (with or without exudate). Patients present with a sore throat as an isolated symptom or as part of a cluster of symptoms that include rhinorrhoea, cough, malaise, fever, headache and hoarseness (laryngitis). Symptoms are relatively short-lived, with 40% of people being symptom free after 3 days and 85% of people symptom free after 1 week.

Conditions to eliminate

Likely cause

Streptococcal sore throat

Application of CPRs should be used to assess the likelihood that the sore throat is of bacterial origin. Common to both criteria are presence of tonsillar exudate, presence of fever and absence of cough. FeverPAIN criteria also considers onset (within 3 days) and severity of tonsillar inflammation, whereas Centor looks at anterior cervical lymphadenopathy (see Table 3.9). FeverPAIN scores range from 1 to 5, and Centor scores are 1 to 4. The likelihood of a bacterial cause increases the higher the score, as shown in the table.

FeverPAIN	Likelihood of bacterial cause (%)	Centor	Likelihood of bacterial cause (%)
0 or 1	13–18	0–2	3–17
2 or 3	34–40	3 or 4	32–56
4 or 5	62–65%		

When scores are high (4 or 5 on FeverPAIN and 3 or 4 on Centor), then antibiotic prescribing should be considered, either immediate or delayed.

Complications arising from streptococcal throat include otitis media, quinsy and acute sinusitis.

Unlikely causes

COVID-19

COVID-19 presents with a wide range of symptoms, but the most common presentations include a new continuous dry cough, high temperature or a loss or change to sense of smell or taste. Other symptoms that can be experienced include sore throat as well as shortness of breath, tiredness, nasal congestion, GI disturbances and loss of appetite.

Glandular fever (infectious mononucleosis)

Glandular fever is caused by the Epstein-Barr virus and is often called the *kissing disease* because transmission primarily occurs from saliva. It has a peak incidence in adolescents and young adults (15–19 years of age). The signs and symptoms of glandular fever can be difficult to distinguish from sore throat because it is characterised by pharyngitis (occasionally with exudates), fever and cervical lymphadenopathy. The person generally has general malaise that is disproportionate to the symptoms experienced. A macular rash can also occur in 10% of patients, appearing in the first days of the illness, and lasts 1 week. Spleen enlargement occurs in approximately 50% of patients. The symptoms tend to be mild but can linger for many months.

Herpangina

Herpangina is seen mainly in children up to 10 years of age. Clinically, it presents as an acute febrile illness with a sore throat and ulcers at the back of the mouth. Red spots appear within hours in the mouth and throat. The lesions become raised into small vesicles, which form a tiny yellowish ulcer with a red rim. The ulcers are generally 1 to 2 mm in diameter. The ulcers take 5 to 10 days to heal. Nausea and abdominal symptoms can also be seen.

Herpetic pharyngitis

Primary herpetic gingivostomatitis is usually seen in children and young adults and presents with fever, sore throat and potentially associated widespread superficial ulcers of the oral mucosa.

Influenza

The onset of influenza is sudden (within a few hours), and typical symptoms include coldlike symptoms, including sore throat; fever, a nonproductive cough; and generalised symptoms such as shivering, chills, malaise, marked aching of limbs, insomnia, fatigue and loss of appetite.

Medicines

A small number of medicines are associated with sore throat because of neutropenia, agranulocytosis or thrombocytopenia. These include penicillamine (common), sulfasalazine (uncommon), carbimazole (rare), clozapine (rare), propylthiouracil (rare), valganciclovir (rare) and captopril (very rare). In addition, all cytotoxic medicines may cause these problems.

Thrush

Candida albicans can cause pharyngitis in immunosuppressed individuals, people who use inhaled corticosteroids or people undergoing chemotherapy or irradiation.

Trauma-related sore throat

Occasionally, patients develop a sore throat from direct irritation of the pharynx. This can be caused by substances such as cigarette smoke, a lodged foreign body or acid reflux.

Very unlikely causes

Laryngeal and tonsillar carcinoma

Both these cancers have a strong link with smoking and excessive alcohol intake and are four times more common in males than in females. Sore throat, hoarseness, dysphonia and dysphagia are the common presenting symptoms. In addition, patients with tonsillar cancer often develop referred ear pain. Any person, regardless of age, who presents with dysphagia should be referred.

Scarlet fever

This is a notifiable infectious disease caused by the bacteria *S. pyogenes*. Twelve to 48 hours before the rash develops, patients may present with sore throat, headache and low-grade fever. The rash, which is blanching, starts on the abdomen before spreading to the neck, limbs and extremities. The rash has a rough, sandpaper-like texture. Mouth inspection often reveals a ‘strawberry tongue’.

Fig. 3.4 helps in the differentiation of serious and nonserious conditions in which sore throat is a major presenting complaint.

Red flags indicative of referral: Sore throat

Reason for referral	Why referring	Timeframe for referral
• Duration >2 weeks	• Suggests nonacute cause and requires further investigation	• As soon as practicable
• FeverPAIN score 4 or 5 or Centor score 3 or 4 if not issuing antibiotics under a patient group direction	• Possibly bacterial cause	
• People taking medications that can interfere with the immune response	• Requires monitoring	
• Widespread blanching rash after sore throat	• Suggests scarlet fever	• Same-day referral
• Dysphagia	• Suggests sinister pathology	

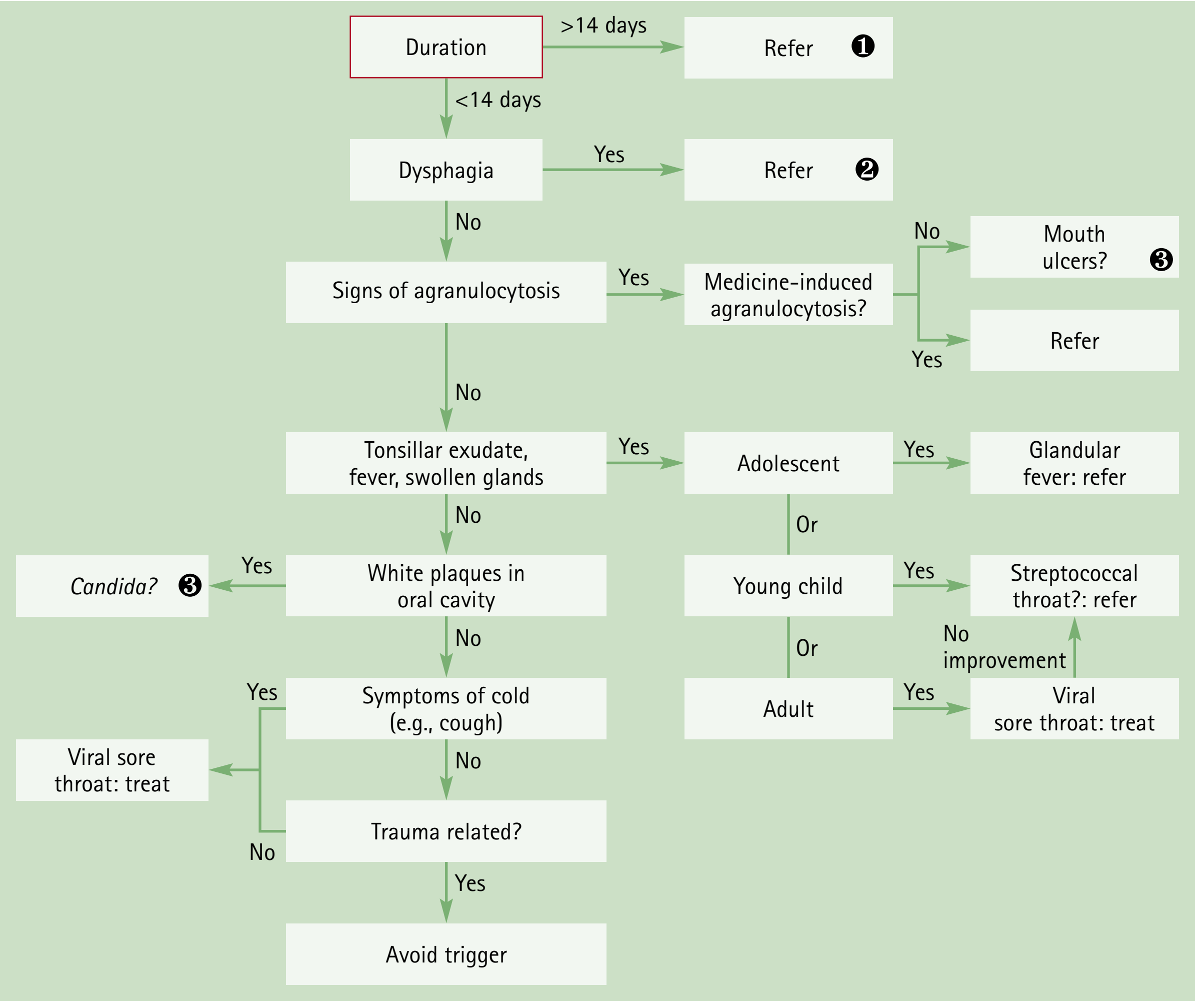
Duration
>14 days
Refer ❶
<14 days
Dysphagia
Yes
Refer ❷
No
Signs of agranulocytosis
Yes
Medicine-induced agranulocytosis?
No
Mouth ulcers? ❸
Yes
Refer
No
Tonsillar exudate, fever, swollen glands
Yes
Adolescent
Yes
Glandular fever: refer
Or
No
Candida? ❸
Yes
White plaques in oral cavity
Young child
Yes
Streptococcal throat?: refer
No
Or
No improvement
Yes
Symptoms of cold (e.g., cough)
Adult
Yes
Viral sore throat: treat
Viral sore throat: treat
No
Trauma related?
No
Yes
Avoid trigger

Fig. 3.4 Primer for differential diagnosis of sore throat.

❶ Duration longer than 2 weeks. The overwhelming majority of cases resolve spontaneously in this time; it is therefore prudent to refer these cases for further investigation.

❷ Dysphagia. Patients with true difficulty in swallowing (i.e., not just caused by pain but by a mechanical blockage) should be referred. Most patients with sore throat find it less easy to swallow, but this has to be differentiated from actual difficulty in swallowing. Severe inflammation of the throat can cause restriction of the airways and thus hinder breathing. Additionally, rare causes of sore throat also have associated dysphagia symptoms, such as peritonsillar abscess and oesophageal carcinoma.

❸ Mouth ulceration and *Candida* (oral thrush) primers. See Chapter 8 and Figs. 8.8 and 8.14 for further differentiation of these conditions.

Evidence base for over-the-counter medication

Because most sore throats are viral in origin and self-limiting, medication aims to relieve symptoms and discomfort while the infection runs its course. Lozenge and spray formulations incorporating antibacterials and anaesthetics provide the mainstay of treatment. In addition, systemic analgesics and antipyretics help to reduce the pain and fever associated with sore throat.

Local anaesthetics

Very few published clinical trials involving products marketed specifically for sore throat have been conducted, yet local anaesthetics have proven efficacy. A study reported on clinicaltrials.gov (US National Library of Medicine, 2013) compared two strengths of lidocaine (1 and 8 mg) in lozenges for sore throat associated with the common cold. The study found no difference in pain relief between the two strengths at 2 and 4 hours. In the absence of a placebo arm, it is difficult to assess whether the pain relief obtained was any different from no treatment.

Antibacterial and antifungal agents

Antibacterial agents include chlorhexidine, tyrothricin, dequalinium chloride and benzalkonium chloride. In vitro testing has shown that many of the proprietary products do have antibacterial activity, and some inhibit *C. albicans* growth. In vivo tests have also shown antibacterial effects. The use of antibacterial and antifungal agents should not be routinely recommended because most sore throats are caused by viral infections against which they have no action. In addition, there are concerns over products containing antibacterial activity contributing to antibacterial resistance. This led to the withdrawal of tyrothricin- (e.g., Tyrocets) containing products in 2020.

Antiinflammatories

Benzydamine is available as a spray or mouthwash; one small trial involving benzydamine as a gargle resulted in significantly greater relief of pain compared with placebo (Thomas et al., 2000). Similar results were shown in another study comparing a mouth spray with placebo (Cingi et al., 2010).

Analgesics

There is good evidence to indicate that simple systemic analgesia (e.g., paracetamol, aspirin, ibuprofen) are effective in reducing the pain associated with sore throat. Thomas et al. (2000) reviewed treatments other than antibiotics for sore throats. They identified 22 trials, 13 of which involving NSAIDs (primarily ibuprofen) or paracetamol, and found that both NSAIDs and paracetamol were effective when taken regularly. Flurbiprofen lozenges have also been shown to be more effective than placebo in reducing pain associated with sore throat (Benrimoj et al., 2001). However, the clinical significance of the benefit is uncertain, and comparisons with active treatments are lacking. In a review in *Prescrire International* (2007), the conclusion was that 'flurbiprofen lozenges have a negative risk-benefit balance. . . . [It] is better to suck real sweets and, if necessary, take paracetamol' (Anonymous, 2007).

Aspirin and saltwater gargles

Gargling with aspirin or saltwater is a common lay remedy for sore throat. No trials appear to have been conducted on their effectiveness, and until evidence becomes available, they should not be recommended.

Practical prescribing and product selection

Prescribing information relating to the sore throat medicines is discussed and summarised in Table 3.12, and useful tips relating to patients presenting with a sore throat are given in the 'Hints and tips' in Box 3.3.

Local anaesthetics (lidocaine, benzocaine)

All local anaesthetics have a short duration of action, and frequent dosing is required to maintain the anaesthetic effect, whether formulated as a lozenge or spray. They appear to be free from any drug interactions, have minimal side effects and can be given to most patients, including pregnant and breastfeeding females. A small number of patients may experience a hypersensitivity reaction with either ingredient, although it appears to be more common with benzocaine. Owing to differences in the chemical structure of these products, cross-sensitivity is unusual; therefore, if a patient experiences side effects with one, the other can be tried. Most lozenges contain a sugar base, but the amount of sugar is too small to affect blood glucose control substantially and therefore can be recommended to patients with diabetes.

Lidocaine (e.g., Chloralieve, Covonia)

All products are for adults and children older than the age of 12 years. The maximum number of lozenges per day varies for each

Table 3.12
Practical prescribing: Summary of sore throat medicines

Name and type of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Local anaesthetics					
Lidocaine	Older than 12 years	Can cause sensitisation reactions	None	None	OK
Benzocaine	Lozenge: older than 3 years Spray: older than 6 years				
Antiinflammatory					
Benzydamine	Rinse: older tha12 years Spray and lozenge: older tha6 years	Oral rinse may cause stinging	None	None	OK
Flurbiprofen	Older tha12 years	None reported		Avoid in patients with peptic ulcers	Avoid

HINTS AND TIPS BOX 3.3: SORE THROAT

Stimulation of saliva production	Sucking a lozenge or pastille promotes saliva production, which lubricates the throat and thus exerts a soothing action.
Gargles or lozenges	Gargles have a very short contact time with inflamed mucosa; therefore, any effect will be short lived. A lozenge or a pastille is preferable because the contact time will be longer.
Difflam rinse	The manufacturers advise that the product should be stored in the box away from direct sunlight even though the stability of the product is not known to be affected by sunlight.

product; Chloralieve adult dosing allows 8 lozenges a day for adults and 4 for children. Covonia can be given to those aged 12 to 18 years of age with a maximum of 5 lozenges a day, and those over 18 can take a maximum of 10 lozenges.

Benzocaine (Ultra Chloraseptic)

Unlike lidocaine, benzocaine can be given to children older than the age of 6 years of age. The dose is one spray every 2 to 3 hours, up to a maximum of eight doses per day. In adults, it is three sprays.

Antiinflammatories

Benzydamine (e.g., Difflam Sore Throat Rinse, Difflam Spray and Lozenge)

The rinse should be used by adults and children older than the age of 12 every 1.5 to 3 hours when required. It occasionally causes stinging, in which case the rinse can be diluted with water.

The dosing frequency for the spray is the same as the rinse (every 1.5–3 hours when required), but unlike the rinse, it can be used in children. For those younger than 6 years, the number of sprays is one per 4 kg of body weight; for those aged 6 to 12 years, it is four puffs. In adults, four to eight puffs can be used. The lozenge (3 mg) is for adults and children older than the age of 6 years, and the dose is to suck one lozenge three times a day. Benzydamine has no drug interactions of note and can be used by all patient groups.

Flurbiprofen (Strefen)

Adults and children older than 12 years can suck one lozenge every 3 to 6 hours, with a maximum of five lozenges in 24 hours. They are contraindicated in patients with peptic ulceration and must be avoided in the last trimester of pregnancy but are suitable for breastfeeding females. If a patient has a known hypersensitivity reaction to an NSAID or aspirin, they should be avoided.

Antibiotic prescribing

Schemes such as Pharmacy First allow supply of antibiotics (penicillin and macrolides), under Patient Group Directions, to people older than 5 years of age who are not immunocompromised. Instigation of antibiotics uses the FeverPAIN score. For antibiotics to be given, the score must be 4 or 5, and the symptoms must be severe.

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Rhinitis

Background

Rhinitis is simply inflammation of the nasal lining. It is characterised by rhinorrhoea, nasal congestion, sneezing and itching. Most

Table 3.13
Allergens responsible for rhinitis

Type	When present	Causative allergen
Intermittent allergic rhinitis	February to April	Tree pollens (hazel and alder associated with early symptoms and silver birch in March and April)
	May to August (peaks in June and July)	Grass pollen
	September to October	Fungal spores
Persistent allergic rhinitis	Year round	House dust mite; animal dander, especially cats

cases that present in a community pharmacy are viral infection or allergy in origin. This section concentrates on the differentiation of allergic rhinitis (AR) from other causes. For AR, there are currently different classifications, but the Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines classify AR into intermittent and persistent categories, with both subdivided into mild or moderate–severe disease (Brozek et al., 2017). The ARIA classification is based on the timing of the symptoms and is divided into intermittent (occurring on <4 days per week and < 4 weeks at a time) or persistent (occurring on >4 days per week and >4 weeks at a time). Rhinitis can have a significant impact on quality of life, impairing performance at work and school and disrupting sleep.

Prevalence and epidemiology

AR is a global health problem that has dramatically increased over the past 25 years, with studies suggesting that the prevalence has at least doubled in that time. Seasonal intermittent AR (hay fever) commonly affects school-aged children, with 10% to 20% of the adolescent population having the condition. The mean age of onset is 10 years; the incidence peaks between the ages of 13 and 19 years. It is believed that improved living standards and reduced risk of childhood infections might increase susceptibility to hay fever. AR is a recognised risk factor for the development of asthma.

Aetiology

AR is a mucosal reaction in response to allergen exposure. Initially, the patient must come into contact with an allergen; for intermittent AR, this is usually pollen or fungal spores. The allergen lodges within the mucus blanket lining the nasal membranes and activates immunoglobulin E (IgE) antibodies (formed from previous allergen exposure)on the surfaces of mast cells. Potent chemical mediators are released, primarily histamine but also leukotrienes, kinins and prostaglandins, which exert their action via neural and vascular mechanisms. This immediate response to an allergen is known as the *early-phase allergic reaction* and gives rise to nasal itch, rhinorrhoea, sneezing and nasal congestion. A late-phase reaction then occurs 4 to 12 hours after allergen exposure, with nasal congestion as the main symptom.

Also of importance is the phenomenon of nasal priming. Patients, after a period of continuous allergen exposure, may find that they experience the same level of severity in symptoms with lower levels of allergen exposure. Similarly, symptoms will be worse than previously experienced when levels of the allergen are the same. This may explain why patients complain of worsening hay fever symptoms the longer the season goes on. Table 3.13 highlights the main allergens responsible for AR.

Table 3.14
Causes of rhinitis and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	● Intermittent allergic rhinitis
Likely	● Infective rhinitis ● Persistent allergic rhinitis ● Rhinitis medicamentosa and medicine-induced rhinitis
Unlikely	● Nonallergic rhinitis ● Structural ○ Adenoidal hypertrophy ○ Deviated nasal septum ○ Foreign body ○ Nasal polyps
Very unlikely	● Endocrine causes ● Tumours

Arriving at a differential diagnosis

In the community pharmacy setting, most patients who present with rhinitis have a cold or intermittent AR. Table 3.14 highlights conditions that may be encountered by community pharmacists. Asking symptom-specific questions helps to establish a differential diagnosis (Table 3.15).

Clinical features of intermittent allergic rhinitis (e.g., hayfever)

Classical symptoms of rhinitis are nasal itch, sneezing (especially paroxysmal), watery rhinorrhoea and nasal congestion. Bilateral symptoms typically develop within minutes after allergen exposure. In addition, symptoms of cough, postnasal drip and allergic conjunctivitis can be seen.

Table 3.15
Specific questions to ask the patient: Rhinitis

Question	Relevance
Unilateral or bilateral nasal symptoms	• Unilateral: rhinitis in general, polyps • Unilateral: deviated nasal septum, foreign body and tumour
Seasonal variation	• Summer months suggest intermittent allergic rhinitis. • Year-round symptoms suggest persistent rhinitis.
History of asthma, eczema or intermittent allergic rhinitis in the family	• If a first-degree relative has atopy, intermittent allergic rhinitis is much more likely.
Allergen exposure	• Intermittent allergic rhinitis symptoms tend to be worse in the morning and evening because pollen levels peak at these times. • Hot and humid weather often exacerbates intermittent allergic rhinitis symptoms. • Infective rhinitis and vasomotor rhinitis are unaffected by pollen count. • Patients with persistent rhinitis might have worsening symptoms when pollen counts are high, but symptoms should persist when indoors.

Conditions to eliminate

Likely causes

Infective rhinitis

This is normally viral in origin and associated with the common cold. Symptoms are acute in onset. Nasal discharge tends to be more mucopurulent than in AR, and nasal itching is uncommon. Sneezing tends not to occur in paroxysms, and the condition resolves more quickly, whereas AR lasts for as long as the person is exposed to the allergen. Other symptoms, such as cough and sore throat, are much more prominent in infective rhinitis than in AR.

Persistent allergic rhinitis

Persistent AR is much less common than intermittent AR. As its name suggests, the problem tends to be persistent and does not exhibit seasonality. Nasal congestion is much more common, which often leads to hyposmia (poor sense of smell), and ocular symptoms are uncommon. Additionally, people with persistent AR also tend to sneeze less frequently and experience more episodes of chronic sinusitis. The most common allergen causing persistent AR is house dust mites, but animal dander (particularly from cats, dogs and horses) is another common cause of symptoms.

Rhinitis medicamentosa and medicine-induced rhinitis

Rhinitis medicamentosa is caused by prolonged use of topical decongestants (>5–7 days), which causes rebound vasodilation of the nasal arterioles, leading to further nasal congestion. Although the exact pathophysiology is unclear, it is thought to be caused by desensitisation of the alpha-adrenoceptors because of constant stimulation.

Systemic medicines associated with congestion or rhinorrhoea include alpha-blockers (common), ACE inhibitors (uncommon) and beta-blockers (rare).

Unlikely causes

Nonallergic rhinitis (vasomotor rhinitis or intrinsic rhinitis)

Nonallergic rhinitis is thought to be caused either by an overactive parasympathetic nervous system response or a hypoactive sympathetic nervous system response to irritants such as dry air, pollutants or strong odours. The symptoms can be similar to those of AR, but results of an allergy test will be negative. Itching and sneezing are less common, and patients might experience worsening nasal symptoms in response to climatic factors, such as changes in temperature or humidity. The onset of symptoms tends to be after the age of 20 years.

Structural

Adenoidal hypertrophy

Adenoidal hypertrophy is characterised by rhinorrhoea, difficulty breathing through the nose, chronic cough, postnasal drip and snoring. If the nasal obstruction is significant, the patient can have sinusitis.

Deviated nasal septum

When a deviated septum is severe, it can block one side of the nose and reduce airflow, causing difficulty breathing. The exposure of a deviated septum to the drying effect of airflow through the nose may sometimes contribute to crusting or bleeding. Patients might report noisy breathing during sleep.

Foreign body

Foreign bodies in the nose are associated with young children and produce unilateral mucopurulent foul-smelling nasal discharge, although this discharge can become blood stained or lead to nosebleeds.

Nasal polyps

Polyps affect 1% to 4% of the general population, with peak incidence in individuals between the ages of 20 and 40 years. They are usually bilateral, and when small, they can be asymptomatic. But as they grow, they cause blocked or runny nose, loss of smell, nosebleeds, postnasal drip and sinus pain.

Very unlikely causes

Endocrine in origin

A hormonal cause should be considered when symptoms coincide with starting contraceptives, hormone replacement therapy or pregnancy. Hypothyroidism can also cause rhinitis. Rhinitis of pregnancy usually starts after the second month of the pregnancy and resolves spontaneously after childbirth. Nasal congestion is the prominent feature.

Tumours

Tumours, either benign (e.g., angiofibroma) or cancerous, cause unilateral nasal obstruction, rhinorrhoea (can be bloody), nosebleeds, facial pain, hearing loss, persistent lymphadenopathy or evidence of cranial neuropathy (e.g., facial numbness or double vision). Most cancers are more common in those people aged older than 50 years of age.

Fig. 3.5 aids in differentiating the different types of rhinitis.

Red flags indicative of referral: Rhinitis

Reason for referral	Why referring	Timeframe for referral
• Failed medication • Medicine-induced rhinitis	• Requires discussion with a doctor for alternative treatment	• As soon as practicable
• Bilateral nasal blockage that fails to clear	• Suggests polyp	
• Unilateral discharge in children	• Possible trapped foreign body	• Same-day GP referral
• Unilateral discharge in older adults	• Possible tumour	• Urgent GP referral

GP, General practitioner.

Evidence base for over-the-counter medication

Before medication is started, it is clearly important to try to identify the causative agent. If this can be achieved, measures to limit exposure will be beneficial in reducing the symptoms experienced by the patient. This is more easily accomplished in patients with persistent AR than in those with seasonal intermittent rhinitis.

Allergen avoidance

Avoidance of pollen is almost impossible, but when possible, exposure to pollen should be reduced. Patients may choose to stay indoors when pollen counts are high. Windows should be closed (when in the house and when travelling in cars), and wrap-around sunglasses may be worn. Patients should avoid walking in areas with the potential for high pollen exposure (e.g., grassy fields, parks, gardens), as well as areas such as city centres because many people with intermittent allergy have increased sensitivity to other irritants, such as car exhaust fumes and cigarette smoke. Air conditioning in cars fitted with pollen filters is also beneficial.

The two main causative agents of persistent AR—house dust mites and animal dander—can be more easily avoided. Pets, for example, can be excluded from certain parts of the house, such as living areas and bedrooms. Acaricidal sprays and strict bedroom cleaning regimens have been shown to be of some benefit in reducing rhinitis symptoms associated with house dust mites (Sheikh et al., 2010). Cleaning regimens should include weekly washing of bedding and mattress covers at high temperatures (to try to kill the mites), replacing carpets with hard wood floors, minimising soft furnishings and avoiding drying clothes on radiators.

Medications

There is a wide range of OTC options to treat patients with AR, allowing most people to exercise self-care.

Systemic therapy: Antihistamines

Both sedating and nonsedating antihistamines are clinically effective in reducing the symptoms associated with AR. However, given the sedative effects of first-generation antihistamines, they should be recommended with caution. Available OTC second-generation antihistamines in the United Kingdom are acrivastine, cetirizine, fexofenadine and loratadine. All are equally effective and are nonsedating, although they are not truly nonsedating and cause different levels of sedation. Loratadine has been shown to have the lowest affinity for histamine receptors in the brain; a study by Mann et al. (2000) reviewing reported sedation with second-generation antihistamines showed loratadine to be the least sedating of the nonsedating antihistamines followed by fexofenadine then acrivastine and finally cetirizine. On this basis, loratadine or fexofenadine are the antihistamines of choice.

Topical therapy

To combat nasal congestion and ocular symptoms, a range of topically administered medications is available, including antihistamines, corticosteroids, mast cell stabilisers and decongestants.

Intranasal medication: Corticosteroids

Intranasal corticosteroids are the most effective overall treatment for AR. A number of clinical trials have confirmed their efficacy, and they have demonstrated superiority to antihistamines in the

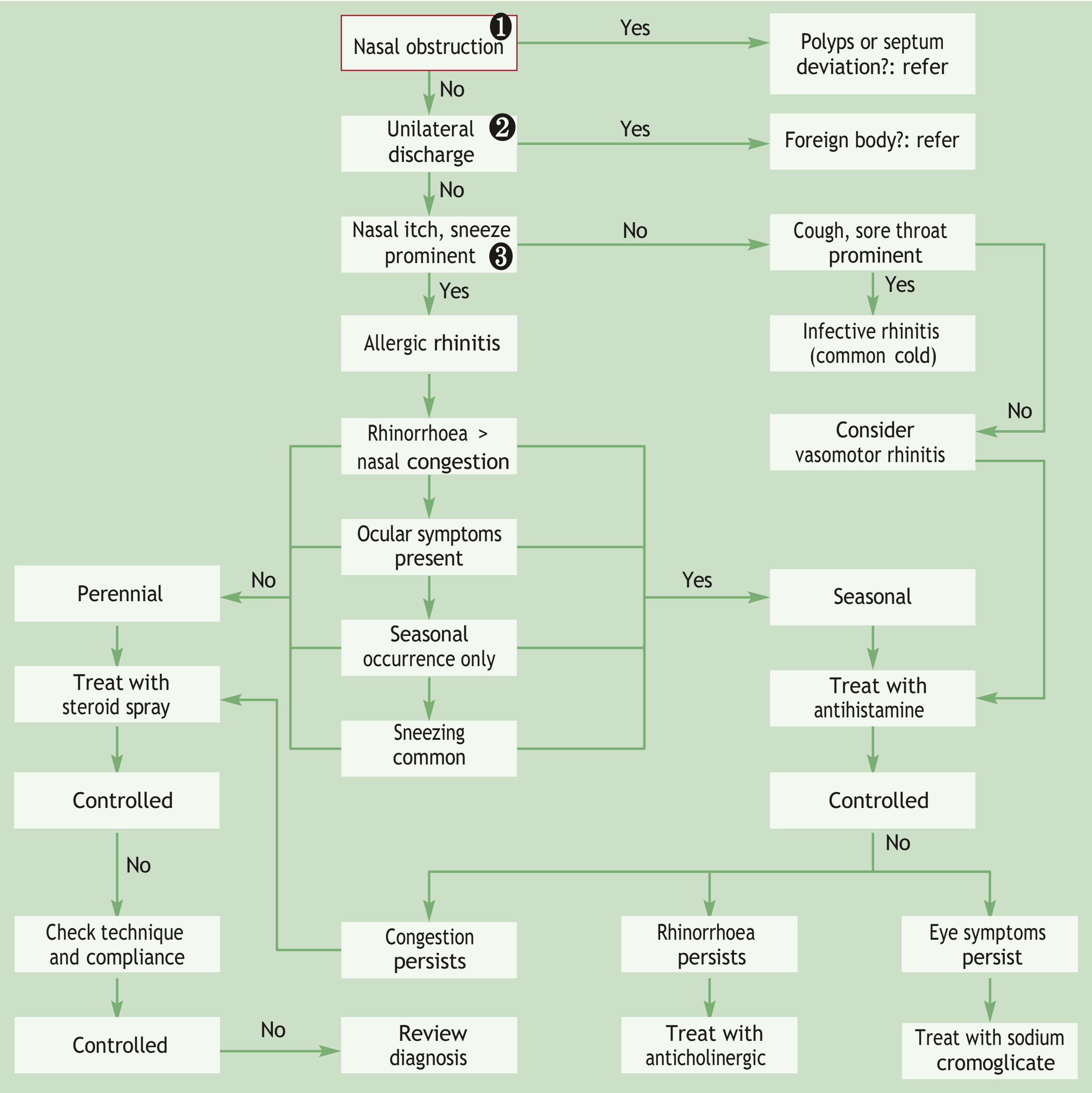
Nasal obstruction ❶
Yes
Polyps or septum deviation?: refer
No
Unilateral discharge ❷
Yes
Foreign body?: refer
No
Nasal itch, sneeze prominent ❸
No
Cough, sore throat prominent
Yes
Yes
Allergic rhinitis
Infective rhinitis (common cold)
No
Rhinorrhoea > nasal congestion
Consider vasomotor rhinitis
Ocular symptoms present
Perennial
No
Yes
Seasonal
Seasonal occurrence only
Treat with steroid spray
Treat with antihistamine
Sneezing common
Controlled
Controlled
No
No
Check technique and compliance
Congestion persists
Rhinorrhoea persists
Eye symptoms persist
Controlled
No
Review diagnosis
Treat with anticholinergic
Treat with sodium cromoglicate

Fig. 3.5 Primer for differential diagnosis of rhinitis.

❶ Nasal obstruction. Nasal obstruction differs from nasal congestion in that obstruction refers to a physical blockage of the nasal passage and is normally caused by an anatomic fault, whereas congestion refers to the nasal passages being temporarily blocked by nasal secretions that can easily be cleared by nose blowing.

❷ Unilateral discharge. Any one-sided nasal discharge must be viewed with suspicion.

❸ Nasal itch and sneeze prominent. Nasal itching and sneezing are typically associated with hay fever, although these symptoms are also associated with perennial rhinitis but to a lesser extent. Sneezing is often said to occur in multiple bouts, which is unlike infective rhinitis.

treatment of patients with AR for all nasal symptoms and equivalence for ocular symptoms (Wallace et al., 2017). There is little difference in efficacy among the intranasal corticosteroids, and clinical evidence does not support the use of one intranasal corticosteroid over another. They have a slow onset of action (12 hours), and maximum clinical efficacy can take up to 2 weeks. Patients who regularly have nasal congestion associated with AR should be advised to commence therapy before exposure to the allergen to maximise symptom control.

Current (summer 2024) UK guidelines recommend steroids to be given to patients with moderate to severe persistent symptoms or when initial management has failed. For mild to moderate intermittent symptoms, intranasal antihistamines are recommended. Currently, no OTC products are available, but as an independent prescriber azelastine could be given.

Decongestants

Topical decongestants are effective in the treatment of patients with nasal congestion but are of limited value in treating those with AR because prolonged use is associated with rebound congestion; however, they may be useful for treating those with intermittent symptoms. Their place in therapy is probably best reserved when nasal congestion needs to be treated quickly and can provide symptom relief while corticosteroid therapy is initiated and has time to begin to exert its action.

Intraocular medications

Mast cell stabilisers

Sodium cromoglicate has proven efficacy and is significantly better than placebo (Lindsay-Miller, 1979). However, it does require dosing four times a day, and adherence might be a problem. Furthermore, cromoglicate takes 4 to 6 weeks to reach maximal response; therefore, mast cell stabilisers alone only have a role when patients can predict the onset of the symptoms well in advance.

Antihistamines

The only ocular antihistamine available OTC is antazoline. It is available in combination with xylometazoline. There appear to be few trial data in the public domain regarding decongestant–antihistamine combinations, although one small trial concluded that a combination of the two drugs was superior to either alone (Abelson et al., 1990). At best it should be used for the short term to avoid possible rebound conjunctivitis caused by xylometazoline.

Sympathomimetics

OTC ocular sympathomimetics are commonly used to control ocular redness and discomfort. There appear to be no significant differences between ocular decongestants based on their vasoconstrictive effectiveness. Like nasal sympathomimetics, they should be restricted to short-term use (<7 days) to avoid rebound effects.

Complementary therapies

Butterbur *(Petasites hybridus)* is widely promoted for use in hayfever. However, a systematic review of complementary and alternative medicines for rhinitis concluded that the current available evidence does not support the use of complementary (alternative) medicines to treat patients with rhinitis (Passalacqua et al., 2006), and a further review also concluded that further evidence is required (Garbo et al., 2013). Until more studies are conducted to assess butterbur's effect, it should not be routinely recommended.

Summary

When using OTC medicines, oral antihistamines are effective and popular with patients because of easy dosing and quick onset of action. They should be used if the patient has mild intermittent general symptoms. Loratadine or fexofenadine should be recommended as first-line therapy because of their propensity to cause the least sedation. Corticosteroid nasal sprays should be the first-line treatment in adults with moderate to severe cases of AR and those who are still symptomatic despite regular use of antihistamines.

Practical prescribing and product selection

Prescribing information relating to the rhinitis medicines reviewed earlier is presented in Table 3.16, and their relative effect on symptom control is summarised in Table 3.17. Useful tips relating to patients presenting with rhinitis are given in 'Hints and tips' in Box 3.4.

Systemic antihistamines

Systemic antihistamines selectively inhibit histamine H_1 receptors and suppress many of the vascular effects of histamine. They have rapid onsets of action (~30–60 minutes) and relieve ocular symptoms, rhinorrhoea and nasal irritation but have less effect on nasal congestion. For maximum effect, they are best taken on a regular basis but are still effective if taken when required. Patient response is variable among the differing antihistamines, and more than one type may have to be tried to provide symptom control. They possess very few side effects and can be given safely with other prescribed medications. They can also be prescribed to all patient groups, although manufacturers advise against prescribing them to older adults.

First-generation sedating antihistamines are the preferred antihistamines in pregnancy because the risk of foetal toxicity appears low, with chlorphenamine being the medicine of choice. Of the nonsedating antihistamines, loratadine is the most widely studied; available data do not indicate an increased risk of teratogenicity, yet manufacturers advise avoidance (presumably based on being outside their product licences). For breastfeeding mothers, nonsedating antihistamines should be avoided because infant drowsiness has been associated with their use. Expert opinion has noted that cetirizine and loratadine can be used if absolutely required.

Nonsedating antihistamines

Acrivastine (Benadryl Allergy Relief)

Acrivastine is recommended for adults and children older than 12 years. The dosage is one capsule (8 mg) as necessary up to three times a day. Acrivastine can also be purchased as a combination product (Benadryl Allergy Relief Plus Decongestant), which contains a sympathomimetic (pseudoephedrine). However, if nasal congestion is a problem, corticosteroids should be considered in preference to a decongestant.

Cetirizine (e.g., Benadryl Allergy, Piriteze and Zirtek)

The dose for adults and children 6 years and older is 10 mg/day. The adult dose is as a single dose (10 mL or one tablet), whereas for

Table 3.16
Practical prescribing: Summary of rhinitis medicines

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Systemic antihistamines					
Acrivastine	Older than 12 years	None	None	None	Manufacturers advise avoidance, but safety data have shown them to be safe
Cetirizine	Older than 2 years				
Loratadine	Older than 2 years				
Fexofenadine	Older than 12 years	Headache, dizziness, nausea			
Chlorphenamine	Older than 1 year	Dry mouth, sedation, dizziness, headache, nausea constipation	Increased sedation with alcohol, opioid analgesics, anxiolytics, hypnotics antidepressants	Glaucoma, prostate enlargement	Standard references state OK, although some manufacturers advise avoidance
Ocular antihistamines					
Antazoline[a]	Older than 12 years	None	Avoid concomitant use with MAOIs and moclobemide because of a risk of hypertensive crisis	Avoid in glaucoma	Safety not established but probably OK because of limited systemic absorption
Nasal corticosteroids					
Beclomethasone	Older than 18 years	Nasal irritation, bitter taste or smell, rash	None	Avoid in glaucoma	Manufacturers advise avoidance, but safety data have shown them to be safe
Fluticasone		Nasal irritation, bitter taste or smell, headache			
Triamcinolone		Headache, nosebleeds, dyspepsia, bronchitis, flulike symptoms, cough			
Budesonide		Nasal irritation, nosebleeds			OK
Mometasone		Headache, nosebleeds			Manufacturers advise avoidance because of a lack of safety data
Ocular mast cell stabiliser					
Sodium cromoglicate	Older than 6 years	None	None	None	OK
Ocular sympathomimetics					
Naphazoline	Older than 12 years	Local irritation	Avoid concomitant use with MAOIs and moclobemide because of a risk of hypertensive crisis	None	Not adequately studied but not yet shown to be a risk; probably OK

[a] Only available in combination with sympathomimetics.
MAOI, Monoamine oxidase inhibitor.

Table 3.17
Efficacy and properties of drug treatments used in allergic rhinitis

Characteristic	Oral antihistamine	Nasal steroid	Nasal decongestant	Ipratropium bromide
Rhinorrhoea	++	+++	–	++
Sneezing	++	+++	–	–
Itching	++	+++	–	–
Blockage	+	+++	++++	–
Eye symptoms	++	++	–	–
Onset of action	1 hour	12 hours	5–15 minute	15–20 minutes
Duration	12–24 hours	12–48 hours	3–6 hours	4–12 hours

–, No effect; +, marginal effect; ++++, substantial effect (under natural exposure conditions).
From Farooque, S. (2012). Allergic rhinitis: Guide to diagnosis, allergen avoidance and treatment. *The Prescriber*, *23*, 330–339.

HINTS AND TIPS BOX 3.4: RHINITIS

Breakthrough symptoms with once-daily antihistamines	• Patients with breakthrough symptoms using a once-daily preparation (e.g., loratadine, cetirizine) may benefit from changing to acrivastine because dosing three times a day may result in better symptom control.
Corticosteroid nasal sprays	• These are suspensions, and the bottle should be shaken before use. Regular usage is essential for full therapeutic benefit. It should also be explained to the patient that maximum relief might not be obtained for several days. However, most begin to act in 3–7 hours.

children older than 6 years, it is given as 5 mg (5 mL, or half a tablet) twice daily. For children between 2 and 5 years of age, the dosage is 2.5 mL (2.5 mg) twice daily. Not all manufacturers have a licence for children younger than 6 years of age, so it is important to refer to specific manufacturer literature before making recommendations.

Fexofenadine (Allevia)

The dosage for those older than 12 years of age is 1 tablet (120 mg) daily. The manufacturer does not recommend their use in pregnancy and breastfeeding because of a lack of safety data.

Loratadine (e.g., Claritin)

Loratadine is available as a tablet or syrup. The dosage for those older than 12 years is 10 mg/day. The syrup (1 mg/mL) can be given to children 2 to 12 years old, but the dose is dependent on body weight.

Sedating antihistamines

Chlorphenamine (e.g., Piriton Allergy Tablets and Syrup)

This can be given to children from 1 to 2 years of age (2.5 mL [1 mg] twice daily). The dosage for children 2 to 6 years of age is 2.5 mL (1 mg) every 4 to 6 hours, and for children 6 to 12 years of age, it is 2 mg (5 mL [2 mg] or half a tablet) every 4 to 6 hours. The dosage for children older than 12 years and adults is 4 mg every 4 to 6 hours.

Sympathomimetics

For information about sympathomimetics and product information on nasally administered products, see earlier in the chapter under the discussion of cold products.

Nasal corticosteroids (beclomethasone, budesonide, fluticasone, mometasone and triamcinolone)

These can be used in most patient groups older than 18 years, although avoidance is recommended in those with glaucoma. (Glaucoma and cataracts have been reported in patients receiving nasal corticosteroids.) In addition, manufacturers other than the makers of budesonide (Benacort) recommend that they should not be used during pregnancy and breastfeeding because of insufficient evidence to establish safety. All can cause nasal irritation or nosebleeds or headache (except beclomethasone); beclomethasone and fluticasone can cause an unpleasant taste and smell; dyspepsia, bronchitis, flulike symptoms and cough have also been reported with triamcinolone.

Beclomethasone (Beconase Hayfever)

The recommended dosage is two sprays into each nostril twice daily (400 µg/day). After symptoms have improved, it might be possible to decrease the dosage to one spray twice daily. However, if symptoms recur, patients should revert to the standard dosage.

Fluticasone (Pirinase Hayfever Nasal Spray), triamcinolone (Nasacort Allergy Nasal Spray), budesonide (Benacort Nasal Spray) and mometasone (Clarinaze Allergy Control)

The dosage is two sprays into each nostril once daily. Like beclomethasone, when symptoms are controlled, the patient should use the lowest effective dose.

Ocular cromoglicate (e.g., Opticrom)

One or two drops should be administered to each eye four times a day. Instillation of the drops can cause a transient blurring of vision but is rare. It has no drug interactions and can be given to all patient groups. Clinical experience has shown cromoglicate to be safe in pregnancy, and expert opinion considers sodium cromoglicate to be safe in breastfeeding.

Ocular sympathomimetics

These contain a combination of a sympathomimetic and antihistamine (antazoline–xylometazoline, Otrivine Antistin) or sympathomimetic alone (e.g., naphazoline 0.01%). They are useful in reducing redness in the eye but do not treat the underlying pathology that is causing the eye to be red. Like all sympathomimetics, they can interact with MAOIs and should not be used by patients receiving such treatment or within 14 days of ceasing therapy.

Otrivine Antistin

Used in adults and children older than 12 years, the dosage is one or two drops two or three times a day. Patients with narrow-angle glaucoma should avoid this product because of the potential of the antihistamine component to increase intraocular pressure. Nosebleed, local transient irritation and a bitter taste after application have been reported.

Naphazoline

The use of products containing naphazoline (e.g., Murine Irritation & Redness Relief Eye Drops, Murine Bright & Moist Eyes, Optrex Bloodshot Eyes Eye Drops, Optrex Brightening Eye Drops) is restricted to adults and children older than 12 years. One to two drops should be administered to the eye three or four times a day.

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Self-assessment questions

The following questions are intended to supplement the text. Two levels of questions are provided, multiple-choice questions and case studies. The multiple-choice questions are designed to test knowledge and application of knowledge, and the case studies allow this knowledge to be put into context in patient scenarios.

Multiple-choice questions

3.1. Which ONE of the following conditions causing cough is most prevalent in the immigrant population?

a. Chronic bronchitis
b. Asthma
c. Heart failure
d. Pneumonia
e. TB

3.2. Which ONE of the following conditions with cough as a major presenting symptom is least likely to produce a productive cough?

a. Chronic bronchitis
b. Asthma
c. Bronchiectasis
d. Pneumonia
e. TB

3.3. Mrs Jones visits your pharmacy complaining of having a dry cough for the last 7 days. After questioning, you decide it is a simple viral infection and recommend simple linctus. If symptoms persist, after how many further days would referral to the physician be appropriate?

a. 3 days
b. 5 days
c. 7 days
d. 10 days
e. 14 days

3.4. Mr Patel, who is 48 years old, presents with a nonproductive cough. Based on epidemiology, which ONE of the following is the most likely cause of the cough?

a. Acute bronchitis
b. Upper airways cough syndrome
c. Asthma
d. Viral infection
e. Pneumothorax

3.5. Dyspnoea is a symptom most closely associated with which ONE of the following conditions?

a. Chronic bronchitis
b. Asthma
c. Heart failure
d. Pneumonia
e. TB

3.6. You are recommending treatment for a young female to help with a common cold (primary symptom of nasal congestion). She tells you that she is breastfeeding. Which ONE of the following would be the most suitable option?

a. Vitamin C
b. Steam inhalation
c. Oral sympathomimetics
d. Topical sympathomimetics
e. Antihistamines

3.7. Simon, who is 32 years old, presents with a nonproductive cough for 6 days. He has no other symptoms and takes no medication. Which ONE of the following would be the most appropriate course of action to take?

a. Advise only on drinking more fluids.
b. Give dextromethorphan, 10 mL qds.
c. Give guaifenesin, 10 mL qds.
d. Give glycerine lemon and honey, 10 mL qds.
e. None of the above is correct.

3.8. Steven Blake, who is 37 years old, visits the pharmacy wanting treatment for his cough. After questioning him, you find out he has had a nonproductive cough for 7 to 10 days. He also states he has had some nasal congestion and has had occasional shortness of breath. Based on this presentation, which ONE of the following is the most likely diagnosis?

a. Upper airways cough syndrome
b. Acute bronchitis
c. Chronic bronchitis
d. Pneumonia
e. Pneumothorax

3.9. Jane Thompson, a 19-year-old female, has a nonproductive cough. You believe it to be a viral infection. Jane has asthma and type 1 diabetes. Which ONE of the following would be the most appropriate treatment or course of action?

a. No treatment
b. A demulcent
c. A cough suppressant
d. An antihistamine
e. An expectorant

3.10. Joanne Martin presents with a productive cough. She tells you that is yellow-green in colour. Given this information, which ONE of the following conditions is most likely?

a. Acute viral infection
b. Heart failure
c. Pneumonia
d. Chronic bronchitis
e. Acute bacterial infection

3.11. David Daly, a 52-year-old male, presents with symptoms of nasal congestion, slight sore throat, headache and loss of smell. You decide to make a referral to the physician because the differential diagnosis suggests which ONE of the following?

a. Influenza
b. Sinusitis
c. Postnasal drip
d. Rhinitis
e. Glandular fever

3.12. A middle-aged male presents with sore throat. He has had the symptoms for 3 days. From the list of other symptoms, which ONE of the following would warrant referral to the physician?

a. Rhinorrhoea, cough, malaise, fever, headache and hoarseness
b. Rhinorrhoea, malaise, fever, headache and hoarseness
c. Rhinorrhoea, cough, malaise, headache and hoarseness
d. Rhinorrhoea, cough, malaise and fever
e. Rhinorrhoea, cough, malaise, fever and hoarseness

3.13. A 28-year-old patient presents with a cold and tells you the following: 'I developed a sore throat a few days ago, and now, as you can hear, my voice is very hoarse. My nose is all bunged up, and I have a headache. I have taken paracetamol, which has not helped that much'. Which ONE of the following is the most appropriate advice to give?

a. See a GP; the paracetamol should have helped to ease the symptoms.
b. See a GP; it sounds like you may now have sinusitis.
c. See a GP; the symptoms sound more like a bacterial infection than a viral infection.
d. It sounds like a typical cold; try some vitamin C and keep taking the paracetamol.
e. It sounds like a typical cold; keep taking the paracetamol and try pseudoephedrine to ease the nasal congestion.

3.14. From the list below, which ONE of the following symptom(s) would best describe a bacterial sore throat?

a. Tonsillar exudate, cough and headache
b. Substantial tonsillar exudate, swollen cervical glands, high-grade fever and no cough
c. Tonsillar exudate, swollen cervical glands, cough and headache
d. Substantial tonsillar exudate and swollen cervical glands
e. Tonsillar exudate, swollen cervical glands and high-grade fever and cough

3.15. Based on epidemiology, which ONE of the following would be the most likely condition for a 55-year-old male with a productive cough and a history of smoking?

a. Acute bronchitis
b. COPD
c. Viral cough
d. Asthma
e. Postnasal drip

Questions 3.16 to 3.21 concern the following conditions:

a. Pneumonia
b. Heart failure
c. TB
d. COPD
e. Laryngotracheobronchitis

Select, from A to E, which of the above conditions:

3.16. Is characterised by night sweats?

3.17. Initially a nonproductive painful cough that progresses to a productive cough?

3.18. Is closely associated with a history of smoking?

3.19. Is associated with a high-grade fever?

3.20. Has cough that is worst in the morning?

3.21. Has a cough with a barklike quality?

Questions 3.22 to 3.25 concern the following medications:

A. Acrivastine
B. Loratadine
C. Chlorphenamine
D. Cetirizine
E. Antazoline

Select, from A to E, which of the above medicines:

3.22. Causes least sedation when orally administered

3.23. Is most likely to cause sedation?

3.24. Is most suitable for a pregnant female with nasal congestion?

3.25. Can be given to children from the age of 1 year old?

Answers

3.1. Answer: e

Rationale: Only TB (e) from the listed conditions is associated with immigrant populations.

3.2. Answer: b

Rationale: Chronic bronchitis (a), bronchiectasis (c) and TB (e) are associated with productive coughs; Pneumonia (d) can start with a nonproductive cough but becomes productive; asthma (b) invariably includes a nonproductive cough.

3.3. Answer: e

Rationale: Conditional referrals are important for safety netting purposes. Acute cough is defined as 3 weeks or less, so in this case, giving 14 days as the referral point is correct because the person has had the cough for just 7 days.

3.4. Answer: d

Rationale: For all patients, regardless of age and gender, viral infection (d) is the most common presentation.

3.5. Answer: c

Rationale: Dyspnoea (difficulty in breathing) could be seen in all the listed conditions. However, in a community pharmacy context, people with conditions other than heart failure (c) are less associated with dyspnoea. Other symptoms such as shortness of breath and fatigue are more frequently seen.

3.6. Answer: d

Rationale: Based on evidence, topical sympathomimetics (d) have the strongest evidence of efficacy. The added problem here is can they be given to this patient group? Manufacturer data state that no adverse effects recorded and state it to be used with caution.

3.7. Answer: a

Rationale: Guaifenesin (c) is for productive coughs. Dextromethorphan (b) is suitable for nonproductive coughs, but current advice is to avoid them when possible. Likewise, although chemically inert, glycerin (d) is not advocated.

3.8. Answer: b

Rationale: Chronic bronchitis (c) tends not to have nasal congestion. Pneumonia (d) after this time should present with productive cough. Pneumothorax (e) is very sudden in onset and will not have this history. This leaves UACS (a) and acute bronchitis (b) as viable options. In this case, acute bronchitis is more likely to have shortness of breath as a symptom.

3.9. Answer: a

Rationale: Viral infections are self-limiting, and no treatment is necessary, so no treatment (a) would be a suitable recommendation. A demulcent could be tried. Because the patient has diabetes, a sugar-free alternative would be useful, but it is unlikely that a few days of treatment with a demulcent containing sugar will affect their diabetic control. If a demulcent containing sugar is recommended, the person could be told to monitor their blood sugar level more regularly. Cough suppressants and antihistamines have no evidence of efficacy and should not be recommended. An expectorant is only suitable for productive coughs.

3.10. Answer: a

Rationale: Sputum colour can be useful in helping to narrow down the differential diagnosis. Viral and bacterial infections can range from sputum with no colour to yellow, green or brown. Given that viral infection is much more prevalent than bacterial infection, this is the most likely condition in this scenario.

3.11. Answer: b

Rationale: Nasal congestion and sore throat are hallmark symptoms of the common cold. However, loss of smell in association with these symptoms can suggest sinusitis.

3.12. Answer: b

Rationale: The symptom cluster of rhinorrhoea, cough, malaise, fever, headache and hoarseness are suggestive of viral infection. Absence of cough can indicate a bacterial infection and is therefore worthy of referral.

3.13. Answer: e

Rationale: Options a, b and c all suggest referral, but the symptom cluster does sound like normal symptoms of a cold and could be treated. This leaves d and e as possible correct answers. Vitamin C (d) has no evidence of efficacy, so e is the most suitable answer.

3.14. Answer: b

Rationale: Option b scores 4 of 4 on Centor scoring.

3.15. Answer: c

Rationale: A viral cause (c) should always be considered most likely, but because this person is middle aged and has a history of smoking, COPD (b) is also likely and should be considered as the next most likely cause.

3.16. Answer: c

Rationale: Associated symptoms with cough are useful in formulating a differential diagnosis. Pneumonia (a) shows signs of infection, heart failure (b) shortness of breath, chronic bronchitis (d), wheeze and breathlessness and croup (e) breathlessness. None shows night sweats.

3.17. Answer: a

Rationale: Most coughs are productive or nonproductive from the outset. Heart failure (b), TB (c) and chronic bronchitis (d) are productive; croup (e) is nonproductive. Only pneumonia (a) from the listed conditions tends to change from nonproductive to productive.

3.18. Answer: d

Rationale: Croup (e) is a childhood condition, pneumonia (a) and TB (c) are infections and heart failure (b) is associated with old age. Chronic bronchitis (d) has a strong association with smoking.

3.19. Answer: a

Rationale: Fever tends to suggest infection. From the answers, only two conditions are infectious in origin, pneumonia (a) and TB (c). Of these, pneumonia often presents with a high fever.

3.20. Answer: d

Rationale: Some coughs can exhibit worse symptoms at certain times of the day. From the listed conditions, this is true of chronic bronchitis (d) and croup (e). Croup shows worsening symptoms in the evening.

3.21. Answer: e

Rationale: The sound of the cough is not normally helpful in establishing a diagnosis. However, for croup (e), the noise of the cough is characteristic and helpful in establishing the diagnosis

3.22. Answer: b

Rationale: Antazoline (e) is only available via the ocular route; chlorphenamine (c) is a first-generation antihistamine and causes sedation; this leaves the three second-generation antihistamines as options. All are less sedating than the first-generation antihistamines, but none are truly nonsedating. Of the three, loratadine (b) appears, from trial data, to be the least sedating.

3.23. Answer: c

Rationale: As per the answer for question 3.22, chlorphenamine (c) is the correct option.

3.24. Answer: c

Rationale: Manufacturers advise against the use of second-generation antihistamines (options a, b and d). Antazoline (e) is not used in nasal congestion.

3.25. Answer: c

Rationale: Acrivastine (a) and antazoline (e) are licensed for use in those from 12 years of age and loratadine (b) and cetirizine (d) from 2 years.

Case studies

CASE STUDY 3.1

Mr Raj Patel (~40 years of age) has asked to speak to you because he has a troublesome cough. He says he has had the cough for about 1 week. The cough is chesty, and he is coughing up some white phlegm. He tells you he takes regular medicines for glaucoma, depression and back pain.

a. State what the problem representation would be for this patient.

As a reminder (from Chapter 1*), The problem representation is a one-sentence summary that highlights the defining features of a case. It is composed of three critical components:*

- *Clinical context (who the patient is, e.g., age, sex, risk factors from past, social, family, medication history)*
- *The temporal pattern of illness (the length and nature of symptom, e.g., acute vs chronic; intermittent vs constant or stable vs progressive)*
- *Key symptoms and examination findings that relate to the presenting symptoms.*

The problem representation could be summed up as'An adult Asian male with multimorbidities presents with acute productive cough'.

b. Based on the problem representation, what would be your hypotheses as to the cause of Mr Patel's cough?

Likely diagnoses:

- *Acute bronchitis*
- *Common cold*
- *Viral cough*

c. If, after questioning, you rule out these three causes of cough, what other possible causes would you need to consider?

The below conditions are associated with productive cough:

- *Asthma*
- *Pneumonia*
- *UCAS*
- *Vocal cord dysfunction*

After further questioning, you find out he has some nasal congestion but no other symptoms. You decide Mr Patel has a viral cough, and a medication history reveals he takes:

- *Manerix (moclobemide) 150 mg bd; he has taken this for more than 6 months.*
- *Trusopt (dorzolamide) 1 drop tds; he has used this for 2 years.*
- *Paracetamol 2 qd prn for lower back pain.*

d. Describe the products available to treat Mr Patel's symptoms and indicate which you consider would be the most beneficial.

Products to treat a productive cough with nasal congestion could be considered, which contain guaifenesin and pseudoephedrine. However, because Mr Patel takes Manerix, sympathomimetics should be avoided.

Case study 3.2

A female patient, who is approximately 30 years old, presents to the pharmacist complaining of a 2-day history of a bothersome sore throat. She says her throat is painful, especially when she has to swallow. She is generally fit and healthy and takes no medication apart from occasional paracetamol for aches and pains.

a. State what the problem representation would be for this patient.

The problem representation could be summed up as:

An adult female presents with a 2-day history of acute sore throat

b. Based on the problem representation, what would be your hypotheses as to the cause of this patient's cough?

Infection (either viral or bacterial)

c. What further actions should you take to enable you to differentiate between a viral and bacterial cause?

Centor or FeverPAIN scoring can be undertaken to assess the likelihood of her symptoms being a streptococcal sore throat.

You find out that her throat appears normal with no ulceration or pus obviously visible; her glands do not feel swollen, but she does have a low fever (38°C).

d. Based on these findings what are her Centor and FeverPAIN scores?

FeverPAIN = 3/5: 34% to 40% chance of streptococcal pharyngitis

Centor = 2/4: 3% to 17% chance of streptococcal pharyngitis

e. You are reasonably confident that the patient has a sore throat of viral origin. What other questions would allow you to rule out other possible causes such as COVID-19, influenza and trauma?

Presence of systemic symptoms: suggests flu or COVID-19

Event precipitating symptoms: suggests trauma

f. What safety netting would you put in place?

Sore throats usually resolve within 1 week. Given she has had symptoms for 2 days, you could tell her that if symptoms are still present in a further 5 days and not improving, then she should return so her symptoms can be reassessed.

Case study 3.3

Mr J, an Asian male in his early 60s who is slightly overweight, wants something for his persistent cough. He has tried some OTC products from the supermarket, but they did not work.

a. State what the problem representation would be for this patient.

The problem representation could be summed up as:

Older adult Asian male presents with a history of nonacute cough apparently unresponsive to home remedies.

b. Based on the problem representation, what would you need to know before coming up with a hypothesis as to the cause of Mr JL's cough?

There is a degree of uncertainty as to the duration of his cough. We need to know what he means by persistent cough.

Mr J tells you that the cough has been present for about 2 months.

c. Given he has had the cough for 2 months, what would be your thinking as to the cause of his cough?

It appears his cough is chronic, and the possible conditions that cause chronic cough and likely to be seen in primary care are:

- *Asthma*
- *Chronic obstructive airways disease*
- *GORD*
- *UACS*

d. You ask more questions from Mr J and find out:

- *Cough is productive but only seems to be a little and is discoloured*
- *Generally feels okay but not 100%; just feels a bit rough but puts this down to coughing*
- *Coughs during the day and has not noticed it being better or worse at any time*
- *Occasional breathlessness but no other symptoms*
- *Current smoker*
- *Gets coughs and colds periodically but not constantly*
- *Medication history: pantoprazole 1 od and levothyroxine 100 µg 1 od*

e. Based on this information and your initial conditions to consider, what do you believe is the cause of his symptoms?

GORD and UACS: nonproductive cough, so seems less likely

Asthma and COPD: both productive; shows no periodicity and has a history of cough, which could be either problem so not helpful in differentiating between conditions; breathlessness more associated with COPD and supported with a smoking history

It seems he may have COPD.

f. What would be your course of action?

Referral for further investigations

Chapter 4

Ophthalmology

CHAPTER OUTLINE

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Background

The eye is one of the most complex organs of the body. Because of its complicated and intricate anatomy, many things can and do go wrong with the eye, and they manifest as ocular symptoms to the patient. It is the pharmacist's role to differentiate between minor self-limiting and serious sight-threatening conditions. Pharmacists can also play a role in health promotion towards eye care, especially in patients who present with repeat medication for degenerative conditions, such as glaucoma and age-related macular degeneration. Checking patient adherence and ability to administer eye drops and ointments correctly and, potentially, identifying any deterioration of the patient's condition should be built into routine counselling.

General overview of eye anatomy

A basic understanding of eye anatomy is useful because knowing which structures are affected will shape the management of the presenting complaint. Fig. 4.1 highlights the principal eye structures.

The eyelids

The eyelids act as protection from excessive light and foreign bodies, as well as spreading lubricating secretions over the eyeballs. They consist mainly of voluntary muscle with a border of thick connective tissue known as the tarsal plate. This plate is felt as a ridge and can be everted, allowing inspection of the palpebral conjunctiva, which can help with diagnosing certain ocular problems. Eyelashes also help to protect the eye. At the base of the eyelashes, sebaceous ciliary glands release lubricating fluid. It is these glands that if infected, can cause styes.

The lacrimal apparatus

The lacrimal apparatus is located at the upper outer margin of the eye orbit (between the corner of the eye and the bridge of the nose). Their function is to drain lacrimal fluid from the orbit. Blockage of the lacrimal duct can lead to dacryocystitis or an increase intraocular pressure (IOP).

The conjunctiva

This is a transparent, thin continuous mucous membrane that covers the inside of the eyelids (palpebral conjunctiva) and the

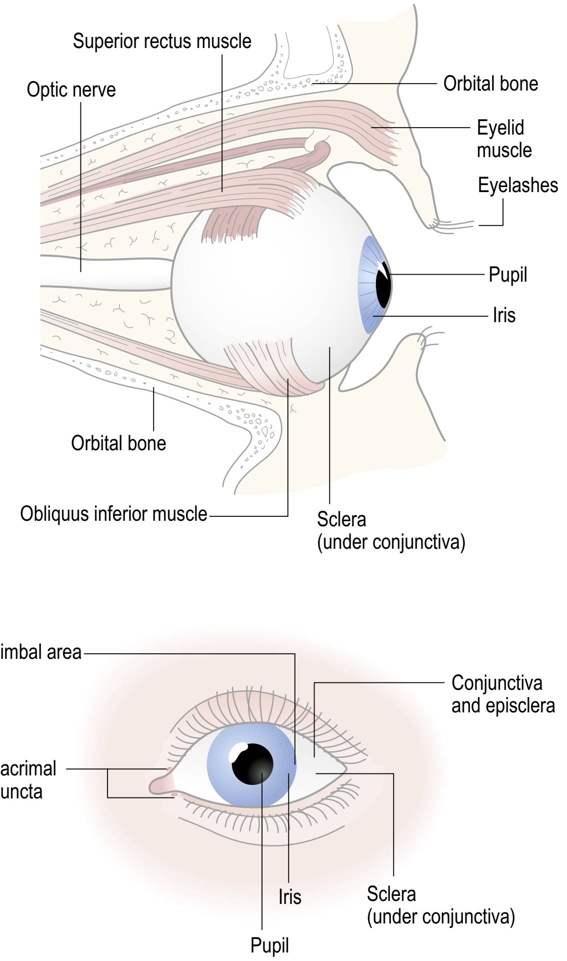

Fig. 4.1 Anatomy of the eye. *Above,* side view; *below,* front view.

sclera (bulbar conjunctiva). It acts as a protective layer for the eye. Dilatation and congestion of blood vessels of the bulbar conjunctiva via infection, allergy or irritants causes red eye.

The sclera and cornea

The sclera encircles the eye, apart from a small window at the very front of the eye where the cornea is located. The sclera is often referred to as the white of the eye and gives shape and rigidity to the eyeball. The transparent cornea allows light to enter the eye and, because of its curved nature, helps to converge light onto the retina; it is responsible for approximately 75% of light refraction.

The iris and pupil

The iris is the coloured part of the eye; its main function is to regulate the amount of light entering the eyeball. It is an incomplete circle, with a hole in the middle, which forms the pupil. It is suspended between the cornea and lens and is attached to the ciliary processes.

The lens

The lens sits behind the pupil and iris and is held in position by fibres that attach to the ciliary processes. It is responsible for fine-focusing light onto the retina and possesses the ability to vary its focusing power. However, this variable focus power is lost with increasing age as the lens grows harder and less elastic. This is why many people require reading glasses as they get older.

The retina

The retina is the light-sensitive layer of the eye and the start of the visual pathway. The functioning of the retina can be compromised by many factors, such as an underlying disease state (e.g., age-related macular degeneration), and foreign bodies, causing retinal damage and detachment.

Interior of the eyeball

The lens divides the interior of the eyeball into the anterior cavity and vitreous chamber. The anterior cavity consists of the anterior (front) and posterior (back) chambers. Both are filled with a watery solution (aqueous humor) that bathes the lens and cornea. This is manufactured behind the iris by the ciliary processes and travels through the posterior chamber and pupil before draining at the anterior chamber angle (where the iris meets the cornea). IOP is produced mainly by this aqueous humor.

History taking and the eye examination

History

A detailed history should be sought from the patient when attempting to decide on the cause of the presenting complaint. Pay attention to changes in vision, the severity and nature of discomfort and the presence of discharge. Do not forget to ask about any family history of eye disease (e.g., glaucoma) and the person's previous eye and medication history.

The history gained should then be supplemented by performing an eye examination. A great deal of information can be learnt from a close inspection of the eye. For example, you can check the size of the pupils, their comparative size and reaction to light, the colour of the sclera, the nature of any discharge and whether there is any eyelid involvement.

The eye examination

Before performing an eye examination, it is important to fully explain to the patient what you are about to do and to gain their consent. There are three basic steps that must be undertaken; the order is unimportant as long as they are all performed:

1. Inspect the eye.
2. Check for visual acuity.
3. Check pupil reactions.

Point 1 will establish the distribution and extent of redness, and points 2 and 3 help to assess for possible sinister pathology. The steps involved in the examination are:

1. Wash your hands.
2. Ask the patient to sit down on a chair so that you are at each other's eye level.

3. Inspect the eye. To allow a full assessment of the distribution and severity of the affected eye(s), it is necessary to view all aspects of the sclera. This is done by basic manipulation of the eyelids.
    - To examine the lower part of the sclera, gently pull down the lower eyelid and ask the patient to look upwards and to both the left and the right.
    - To examine the upper part of the sclera, you need to gently lift the upper eyelid and ask the patient to look downwards and to both the left and the right.
4. Check for visual acuity.
   Visual acuity can be assessed by asking the patient to read small print with the affected eye while blocking off the good eye. Printed material should be held at a minimum of arm's length and the person asked to read the text.
5. Check pupil size, shape and reactions.
   Conditions which are within the remit of community pharmacy management should show pupils should be round, symmetrical and equal in size, with normal pupil reflexes.
    - The patient should look directly at you while you bring in the light source from the side of their face.
    - The light should be shone onto the pupil for less than 1 second to evoke a pupil reaction. Direct and consensual responses should be checked.

If only one eye is affected, you should perform these procedures on the other eye so you can compare between normal and abnormal.

It is also possible that while examining the eye, the pharmacist may encounter nonred eye-related pathology. For example, pinguecula (yellowish, slightly raised thickening of the conjunctiva on the sclera close to the edge of the cornea, Fig. 4.2), pterygium (raised, triangular or wedge-shaped benign growth of conjunctiva tissue, Fig. 4.3) and xanthelasma (yellowish deposit of cholesterol under the skin on or around the eyelids, Fig. 4.4). These are best referred to an optician for fuller evaluation.

Red eye

Background

Conjunctivitis simply means inflammation of the conjunctiva; it is characterised by varying degrees of ocular redness, irritation, itching and discharge. Redness of the eye and inflammation of the conjunctiva have been reported as being the most common ophthalmic problems encountered in the Western world.

Because conjunctivitis (bacterial, viral and allergic forms) is the most common ocular condition encountered by community pharmacists, this section focuses on recognising the different types of conjunctivitis and differentially diagnosing them from more serious ocular disorders.

Prevalence and epidemiology

The exact prevalence of infective conjunctivitis is not known, although statistics from general practice show that eye problems account for up to 1% of their workload; one small UK community pharmacy–based study found that on average two cases of red eye per week are seen in community pharmacies. Conjunctivitis seems to affect the sexes equally and may present in any age of patient, although bacterial conjunctivitis is more common in children, and viral conjunctivitis is more common in adults. All three types of conjunctivitis are essentially self-limiting, although viral conjunctivitis can recur and persist for many weeks.

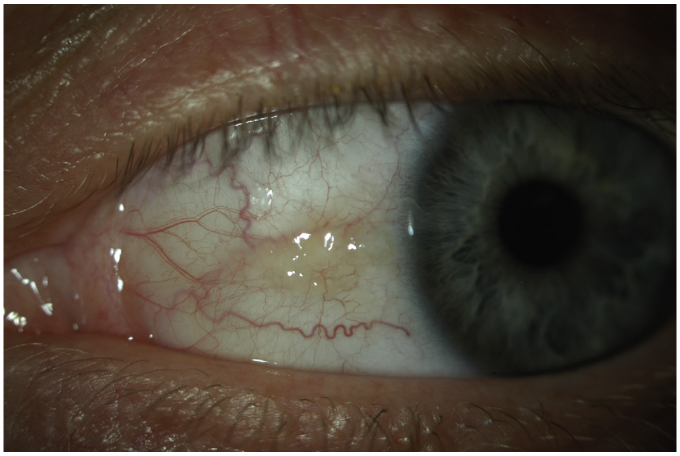

Fig. 4.2 Pinguecula. (From [2022]. *Clinical anatomy and physiology of the visual system* [4th ed.].)

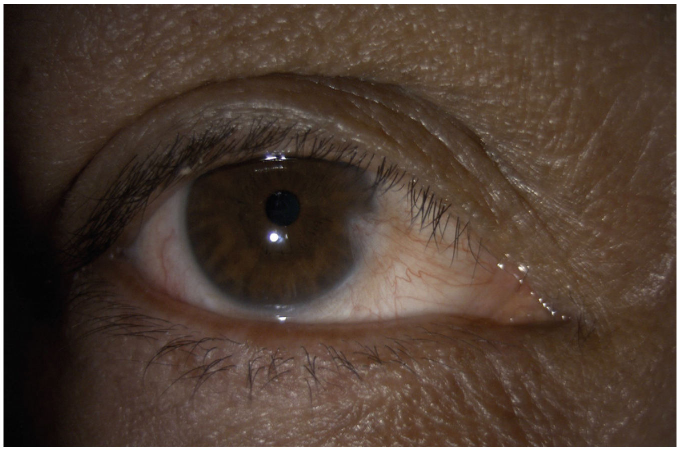

Fig. 4.3 Pterygium. (From [2022]. *Clinical anatomy and physiology of the visual system* [4th ed.].)

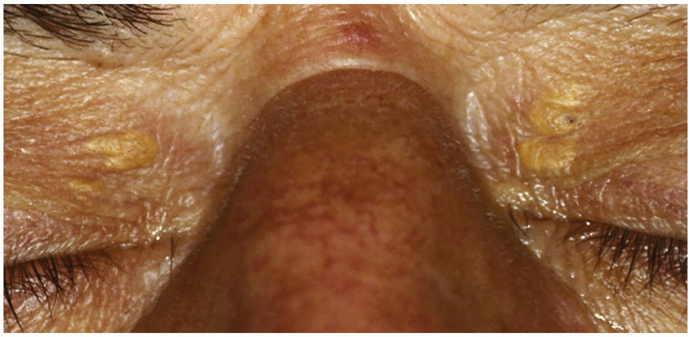

Fig. 4.4 Xanthelasma. (From [2021]. *Clinical procedures in primary eye care* [5th ed.].)

Table 4.1
Causes of red eye and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Allergic conjunctivitis • Bacterial conjunctivitis • Viral conjunctivitis
Likely	• Subconjunctival haemorrhage
Unlikely	• Anterior uveitis • Blepharitis • Chlamydial conjunctivitis • Corneal abrasion or foreign body • Episcleritis • Herpes simplex • Keratitis (corneal ulcer) • Scleritis
Very unlikely	• Acute closed-angle glaucoma

Aetiology

Pathogens that cause bacterial conjunctivitis vary between adults and children. In adults, *Staphylococcus* species are most common (>50% of cases) followed by *Streptococcus pneumoniae* (20%), *Moraxella* species (5%) and *Haemophilus influenzae* (5%). In children, *Streptococcus, Moraxella* and *Haemophilus* spp. are most common. The adenovirus is most implicated in viral conjunctivitis, and pollen usually causes seasonal allergic conjunctivitis.

Arriving at a differential diagnosis

Redness of the eye can occur alone or present with accompanying symptoms of pain, discomfort, discharge and changes in vision. Table 4.1 highlights the conditions that may be seen by the pharmacist. Along with an examination of the eye, a number of eye-specific questions should be asked to help establish a differential diagnosis (Table 4.2).

Clinical features of conjunctivitis

Each of the three common types of conjunctivitis has similar but overlapping symptoms. Table 4.3 and Figs. 4.5 to 4.7 highlight the similarities and differences in the classic presentations of the three conditions.

Conditions to eliminate

Likely cause

Subconjunctival haemorrhage

The rupture of a blood vessel under the conjunctiva causes subconjunctival haemorrhage. A segment of or even the whole eye will appear bright red (Fig. 4.8). It occurs spontaneously but can be precipitated by coughing, straining or lifting. The suddenness of symptoms and the brightness of the blood invariably mean that patients present very soon after they have noticed the problem. There is no pain, and the patient should be reassured that symptoms will resolve in 10 to 14 days without treatment. However, a patient with a history of trauma should be referred to exclude ocular injury.

Table 4.2
Specific questions to ask the patient: Red eye

Question	Relevance
Discharge	• Watery: viral and allergic conjunctivitis, corneal abrasion, herpes simplex, keratitis • Mucopurulent: bacterial and chlamydial conjunctivitis
Eye pain	• A number of conditions cause true eye pain and most have sinister pathology; these conditions are summarised in Table 4.4
Location of redness	• Redness concentrated near or around the coloured part of the eye (limbal area) can indicate sinister pathology (e.g., uveitis) • Generalised redness and redness towards the fornices (corner of the eyes) is more indicative of conjunctivitis • Localised scleral redness can indicate scleritis or episcleritis
Duration	• Any ocular redness, apart from subconjunctival haemorrhage, and allergic conjunctivitis that lasts more than 1 week is unusual
Photophobia	• Usually associated with sinister eye pathology (e.g., keratitis, corneal abrasion and uveitis)
Other symptoms	• Signs and symptoms of an upper respiratory tract infection suggest viral conjunctivitis • Vomiting suggests glaucoma

Unlikely causes

Anterior uveitis (iritis)

Uveitis describes inflammation involving the uveal tract (iris, ciliary body and choroids). It is commonly seen in individuals who have a systemic autoimmune inflammatory disease, such as rheumatoid arthritis or ulcerative colitis. Photophobia and pain are prominent features with the pain described as a dull ache (radiating into the eyebrow or temple). Usually, only one eye is affected (but it can be bilateral), and the redness is often localised to the limbal area (known as the *ciliary flush*). On examination, the pupil appears irregularly shaped, constricted or fixed, and reduced visual acuity observed (Fig. 4.9). The pain may be exacerbated when reading or performing close work. Immediate referral is needed.

Table 4.3
Condition summary of the four common causes of red eye seen in primary care

	Bacterial conjunctivitis	Viral conjunctivitis	Allergic conjunctivitis	Subconjunctival haemorrhage
Eyes affected	Normally both; occasionally unilateral	Both, but one eye is often affected first	Both	One
Discharge	Often mucopurulent secretions with bilateral glued eyes upon awakening	Watery	Watery	None
Pain	Mild to moderate; gritty discomfort often described as a 'foreign body' sensation	Gritty discomfort and associated mild itching	Itching (can be intense)	None
Distribution of redness	Generalised and diffuse	Generalised	Generalised but greatest in fornices	Localised or generalised
Associated symptoms	None commonly	Cough and cold symptoms	Rhinitis (may also have family history of atopy)	None

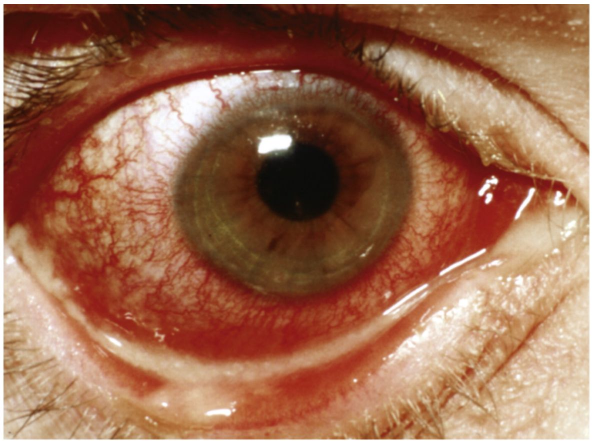

Fig. 4.5 Bacterial conjunctivitis. (From Palay, D. A., & Krachmer, J. H. [2005]. *Primary care ophthalmology* [2nd ed.]. Elsevier Mosby.)

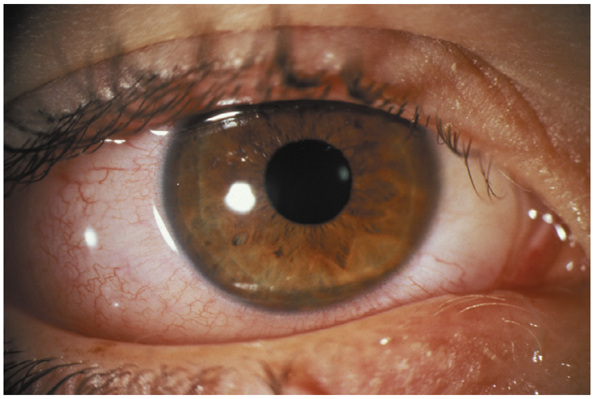

Fig. 4.7 Allergic conjunctivitis. (From Krachmer, J. H., Mannis, M. J., & Holland, E. J. [Eds.]. [2005]. *Cornea: Fundamentals, diagnosis and management* [Vol. 1, 3rd ed.]. Elsevier Mosby.)

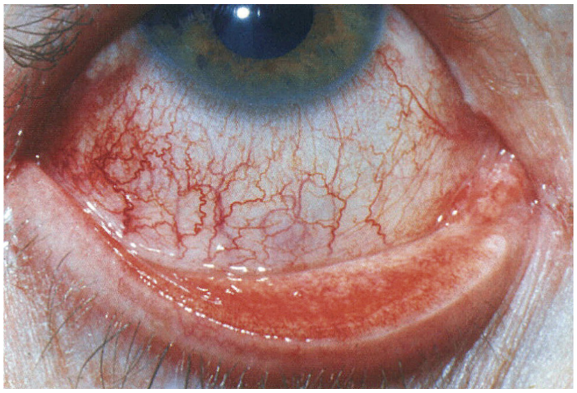

Fig. 4.6 Viral conjunctivitis. (From Sowka, J. W., Gurwood, A. S., & Kabat, A. *Handbook of ocular disease management* [4th ed.]. Jobson Publishing.)

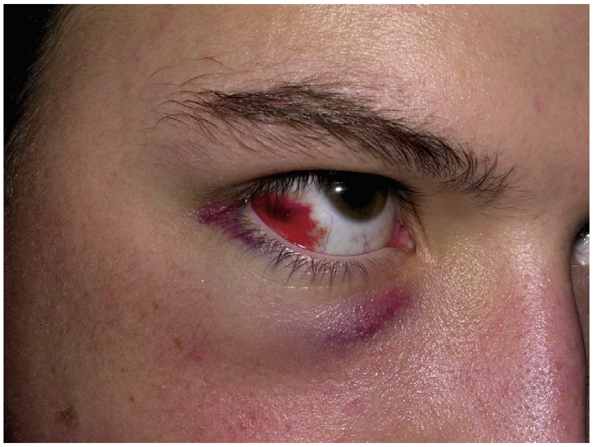

Fig. 4.8 Subconjunctival haemorrhage.

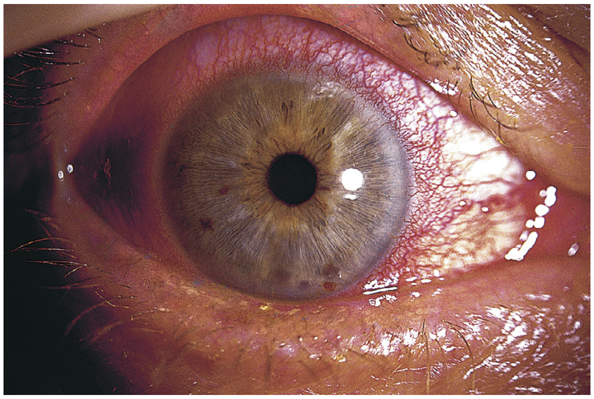

Fig. 4.9 Uveitis. (From Kanski, J. J. [2006]. *Clinical diagnosis in ophthalmology.* Elsevier Mosby.)

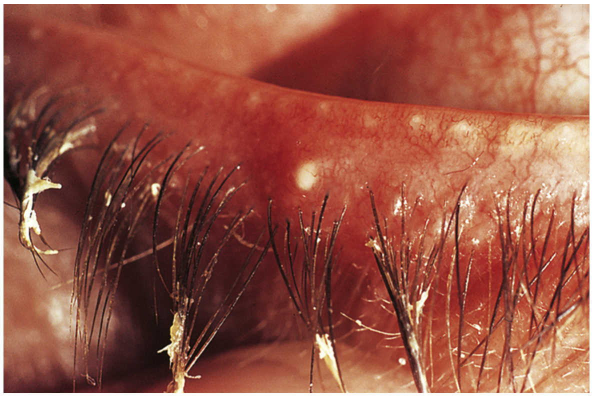

Fig. 4.10 Blepharitis. (From Kanski, J. K. [2007]. *Clinical ophthalmology: A systematic approach* [6th ed.]. Butterworth Heinemann.)

Blepharitis

Although blepharitis usually does not present with red eye, in chronic cases, madarosis (missing eyelashes) and trichiasis (in-turned eyelashes) can occur, which leads to local irritation and result in conjunctivitis (Fig. 4.10). For a fuller description of blepharitis and conditions that are similar, refer to the eyelid disorder section later in this chapter.

Chlamydial conjunctivitis

This usually presents with bilateral diffuse redness, a gritty sensation and mucopurulent discharge. Chlamydial conjunctivitis should be suspected in young (15–35 years) sexually active patients. Most often, patients with chlamydial conjunctivitis have an associated genital infection (of which they may be unaware). Bilateral red eye within the first month of birth is associated with maternal chlamydial infection. The baby will present with purulent or mucoid discharge and diffuse redness.

Corneal abrasion or foreign body

These are generally a result of trauma to the surface of the eye, and symptoms depend on the cause and severity of the injury. Common causes include a fingernail scratching the eye or walking into something sharp. Injuries can also be caused by contact lens insertion and removal. Red watering eyes accompanied with photophobia, severe eye pain and possible loss of visual acuity can be seen (Fig. 4.11).

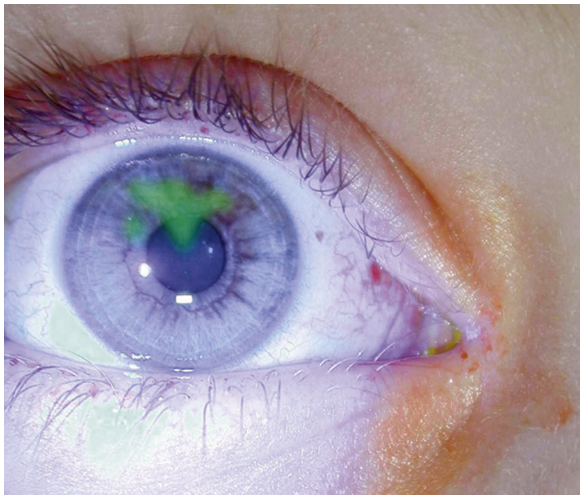

Fig. 4.11 Corneal abrasion. (From [2020]. *Nelson textbook of pediatrics*.)

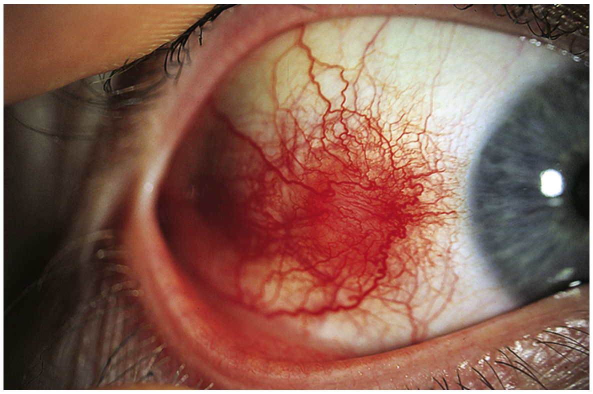

Fig. 4.12 Episcleritis. (From Kanski, J. J. [2007]. *Clinical ophthalmology: A systematic approach* [6th ed.]. Butterworth Heinemann.)

Episcleritis

The episclera lies just beneath the conjunctiva and adjacent to the sclera. If this becomes inflamed, the eye appears red, which is segmental, affecting only part of the eye (Fig. 4.12). The condition affects only one eye in most cases and is usually painless; however, a dull ache might be present. It is more commonly seen in young females and is usually self-limiting, resolving in 2 to 3 weeks, but it can take 6 to 8 weeks before symptoms disappear.

Herpes simplex

Herpes simplex is usually associated with cold sores and genital herpes, but it can cause eye infections. Unilateral red eye symptoms accompanied by watery discharge, blurred vision, reduced visual acuity and eye pain can be experienced. Besides eye symptoms, the person may exhibit crops of vesicles along the eyelid margin or periocular skin. Recurrence is common and can cause corneal scarring as a complication.

Keratitis (corneal ulcer)

Keratitis is generally an infectious cause but can occur through other causes such as administration of long-term steroid drops but is rare. The incidence is increasing in the Western world and is linked to greater usage of contact lenses. A compromised corneal epithelium, often caused by an abrasion by a foreign body, is required to allow infiltration by invading pathogens. *Acanthamoeba* infection is commonly implicated.

Pain, which can be very severe, is a prominent feature. The patient usually also complains of photophobia, a worsening of redness around the iris (limbal redness), a watery discharge and eyelid oedema. Physical examination shows a loss of visual acuity often accompanied by a small pupil. Immediate referral is needed because loss of sight is possible if left untreated.

Scleritis

Inflammation of the sclera is much less common than episcleritis. It is often associated with connective tissue disorders and autoimmune diseases. For example, in 20% of cases, the patient has rheumatoid arthritis. It presents similarly to episcleritis, but pain (generally severe) is a predominant feature, as is blurred vision. Eye movement can worsen pain. Scleritis also tends to affect older people (mean presentation age, early 50s). Discharge is rare or absent in both episcleritis and scleritis.

Very unlikely cause

Acute closed-angle glaucoma

There are two main types of glaucoma:

- Simple chronic open-angle glaucoma, which does not cause pain
- Acute closed-angle glaucoma, which can present with a painful red eye

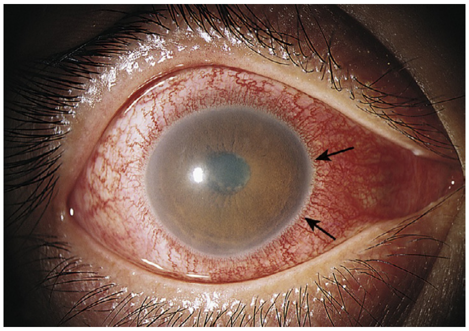

Fig. 4.13 Acute-angle glaucoma. (From Roberts, J. R., & Hedges, J. R. [2010]. *Clinical procedures in emergency medicine* [5th ed.]. Philadelphia, Saunders.)

The latter requires immediate referral to an emergency department because it is a sight-threatening condition. It is caused by inadequate drainage of aqueous fluid from the anterior chamber of the eye, which results in a rapid increase in IOP. The onset can be very quick and characteristically occurs in the evening. Severe unilateral eye pain associated with a headache on the same side as the painful eye is the major presenting symptom. The eye appears red and may be cloudy (Fig. 4.13). Vision is blurred or decreased, and the patient might also notice haloes around lights. Vomiting is often experienced because of the rapid increase in IOP. The pupil appears fixed in a vertically oval shape. It classically occurs in older, far-sighted patients. Because it is such a painful condition, patients are unlikely to present to a community pharmacist.

Table 4.4 and Fig. 4.14 can be used to help differentiate between serious and nonserious red eye conditions.

Red flags indicative of referral: Red eye

Reason for referral	Why referring	Timeframe for referral
• Clouding of the cornea • Associated vomiting	• Suggests glaucoma	• Immediately to emergency department
• Redness caused by a foreign body	• Requires removal of body	• Urgent same-day referral to an optician
• Irregular-shaped pupil • Abnormal pupil reaction to light • Decrease in visual acuity or distortion of vision Photophobia • True eye pain • Redness localised around the limbal area	• Suggests sinister pathology	

Evidence base for over-the-counter medication

Bacterial conjunctivitis

Propamidine and dibromopropamidine isethionate have been used for decades to treat patients with conjunctivitis and are active against a wide range of organisms, including those responsible for bacterial conjunctivitis. However, clinical trials are lacking to substantiate their effectiveness, and a further possible limitation is the licensed dosage regimen (four times a day for drops). This has been reported to be too infrequent to achieve a sufficient concentration to kill or stop the growth of the infecting pathogen.

Chloramphenicol

A Cochrane review (2023) assessed the effectiveness and use of chloramphenicol across 21 randomised controlled trials involving 8805 people. Findings showed chloramphenicol improved

Table 4.4
Conditions in which eye pain is a prominent feature

	Discharge	Visual disturbance	Pupil shape and reaction	Visual acuity	Eyes affected	Redness	Severity of pain
Uveitis	No	Photophobia	Abnormal	Reduced	One	Often pronounced around iris	Moderate
Keratitis	Watery	Photophobia	Abnormal	Reduced	One or both	Often pronounced around iris	Severe
Scleritis	Unusual	No	Normal	Can be reduced	One	Segmental	Moderate
Corneal abrasion	Watery	Photophobia	Normal	Can be reduced	One	Generalised	Severe
Glaucoma	Watery	Blurred	Abnormal	Reduced	One	Haloes	Severe

clinical cure rates by 26% compared with placebo (Chen et al., 2023).

Summary

Despite the findings from the 2023 Cochrane review, current (spring 2024) UK guidance advocates caution in antibiotic use and recommend they should be reserved for when symptoms are severe or circumstances require rapid resolution (e.g., allowing people to return to work).

Viral conjunctivitis

Currently, there are no over-the-counter (OTC) preparations available to treat patients with viral conjunctivitis. However, symptoms may be eased by bathing the eyelids to remove any discharge and using lubricant eye drops. Viral causes are highly contagious, and the patient should be told to follow strict hygiene measures (e.g., not sharing towels, washing hands frequently), which will help to control the spread of the virus. Despite its contagious nature, current UK guidance is to allow children still to attend school unless an outbreak occurs.

Allergic conjunctivitis

Avoidance of the allergen will, in theory, result in the control of symptoms. However, total avoidance is almost impossible, and the use of prophylactic medication is advocated. The evidence base for ocular mast cell stabilisers, sympathomimetics and oral antihistamines is discussed in Chapter 3 in the rhinitis section.

Practical prescribing and product selection

Prescribing information relating to medication for red eye reviewed in the section 'Evidence base for over-the-counter medication' is discussed and summarised in Table 4.5; useful tips relating to treatment are given in 'Hints and tips' in Box 4.1.

Chloramphenicol (e.g., Brolene Antibiotic Drops, Golden Eye Antibiotic Drops and Ointment, Optrex Infected Eye Drops and Ointment)

Chloramphenicol drops and ointment are licensed for use in children older than 2 years. The recommended dosage for the drops is one drop every 2 hours for the first 48 hours and then reducing to four times a day for a maximum of 5 days treatment. The ointment, if used in conjunction with the drops, should only be applied at night; approximately 1 cm of ointment should be applied to the inside of the eyelid, after which blinking several times will spread the ointment. If used alone, the ointment should be used three or four times a day. There are no drug interactions, and it can be used in most patient groups, although they should be avoided in patients with a family history of blood dyscrasias. For use in pregnancy, a lack of manufacturer data means that they are not recommended, so hygiene measures should be adopted. If absolutely necessary, they can be used in breastfeeding females.

Propamidine isethionate (Brolene and Golden Eye drops) and dibromopropamidine isethionate (Golden Eye ointment)

Propamidine isethionate 0.1% and dibromopropamidine isethionate 0.15% are licensed for adults and children older than 2 years. The dosage for eye drops is one or two drops up to four times daily; the ointment should be applied once or twice daily. Blurring of vision may occur when first used but is transient. There are no drug interactions, and it can be used in most patient groups, although the manufacturers state that safety for use in pregnancy has not been established; however, there appear to be no reports of teratogenic effects.

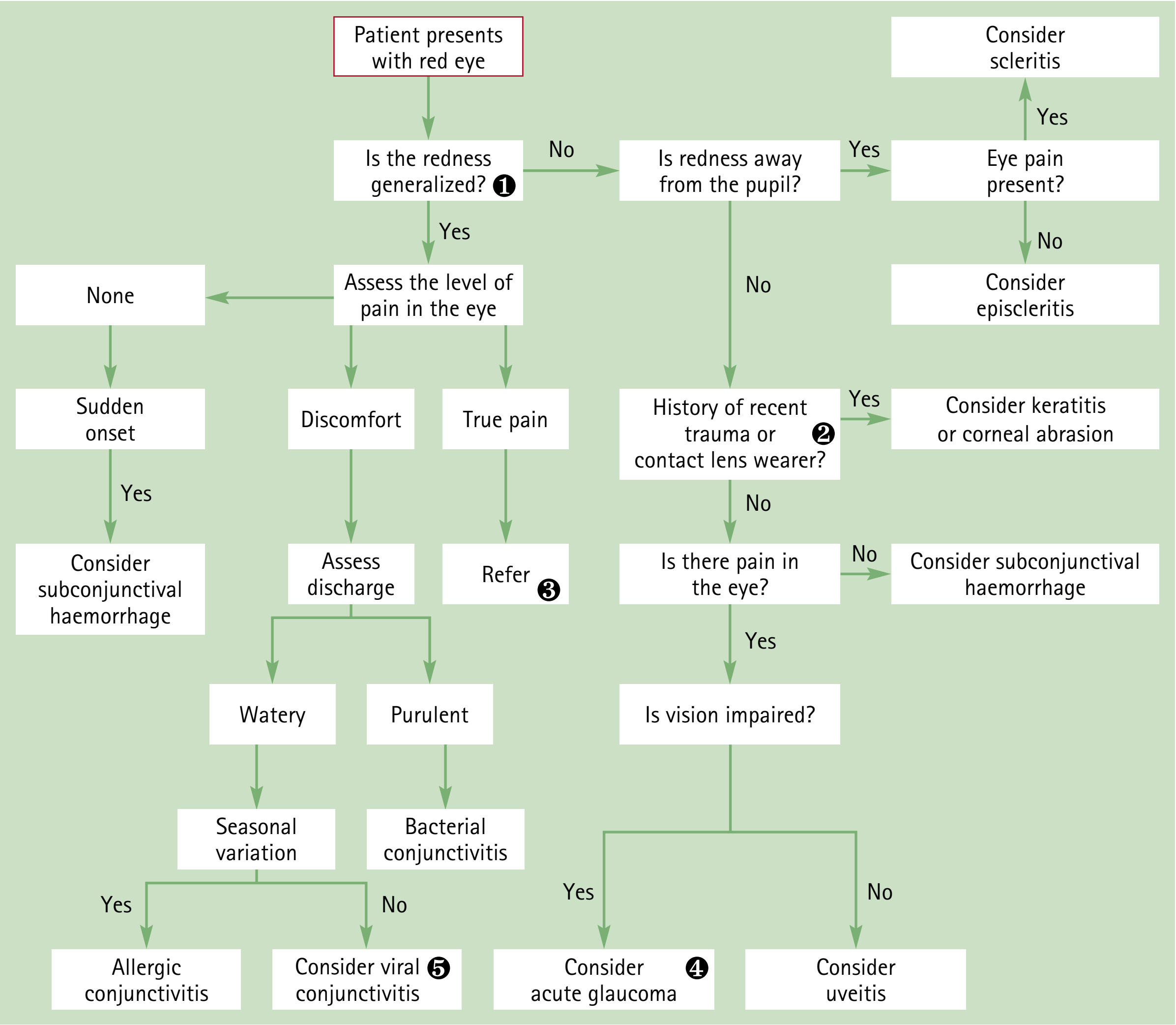
Patient presents with red eye
Is the redness generalized? ❶
No
Is redness away from the pupil?
Yes
Eye pain present?
Yes
Consider scleritis
No
Consider episcleritis
Yes
Assess the level of pain in the eye
None
Sudden onset
Yes
Consider subconjunctival haemorrhage
Discomfort
Assess discharge
Watery
Seasonal variation
Yes
Allergic conjunctivitis
No
Consider viral ❺ conjunctivitis
Purulent
Bacterial conjunctivitis
True pain
Refer ❸
No
History of recent trauma or ❷ contact lens wearer?
Yes
Consider keratitis or corneal abrasion
No
Is there pain in the eye?
No
Consider subconjunctival haemorrhage
Yes
Is vision impaired?
Yes
Consider ❹ acute glaucoma
No
Consider uveitis

Fig. 4.14 Primer for differential diagnosis of red eye.

❶ Generalised redness. Most episodes of conjunctivitis show generalised redness, although the intensity of redness tends to be worse towards the corners of the eye or away from the pupil. Occasionally, severe conjunctivitis can have marked redness throughout the eye.

❷ Contact lens wearers. Contact lens wearers are more predisposed to keratitis because the space between the contact lens and cornea can act as an incubator for bacteria and enhance mechanical abrasion. This is especially true if patients sleep with their lenses in because the contact time for abrasion to occur is prolonged.

❸ True pain. It is important to distinguish true pain from ocular irritation. Red eye caused by conjunctivitis causes discomfort, often described as a gritty or a foreign body sensation. It does not normally cause true eye pain. True pain would indicate more serious ocular pathology, such as herpes simplex, scleritis, uveitis or keratitis.

❹ Glaucoma. This is more common in people older than 50 years and far-sighted people. Dim light can precipitate an attack.

❺ Viral conjunctivitis. Associated symptoms of an upper respiratory tract infection might be present (e.g., cough and cold). Viral conjunctivitis often occurs in epidemics, and it is not unusual to see a number of cases in a very short space of time.

Mast cell stabiliser (sodium cromoglicate, e.g., Opticrom)

Because this is a prophylactic agent, it needs to be given continuously while the patient is exposed to the allergen. The dosage is one or two drops administered in each eye four times a day for children aged 6 years of age and older. Clinical experience has shown it to be safe in pregnancy, and expert opinion considers sodium cromoglicate to be safe in breastfeeding. It has no drug interactions and can be given to all patient groups. Instillation of the drops may cause a transient blurring of vision.

Table 4.5
Practical prescribing: Summary of medicines for red eye

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients for whom care is exercised	Pregnancy and breastfeeding
Allergic conjunctivitis					
Mast cell stabilisers (e.g., sodium cromoglicate)	Older than 6 years	Local irritation, blurred vision	None	None	OK
Antihistamines (e.g., antazoline)[a]	Older than 12 years	Local irritation, bitter taste, nosebleed	Avoid concomitant use with MAOIs and moclobemide due to risk of hypertensive crisis	Avoid in glaucoma	OK
Sympathomimetics (e.g., naphazoline)	Older than 12 years	Local irritation	Avoid concomitant use with MAOIs and moclobemide due to risk of hypertensive crisis	None	Not adequately studied but not yet shown to be a risk; probably OK
Bacterial conjunctivitis					
Chloramphenicol	Older than 2 years	Local burning and stinging	None	Avoid if there is a family history of blood and bone marrow problems	In pregnancy, ideally avoid OK in breastfeeding
Propamidine and dibromopropamidine isethionate	Older than 2 years	Blurred vision	None	None	OK

[a] Only available in combination with naphazoline.
MAOI, Monoamine oxidase inhibitor.

Sympathomimetics

These agents can be used to reduce redness of the eye. Products contain a combination of sympathomimetic and antihistamine (e.g., antazoline–xylometazoline [Otrivine-Antistin]) or sympathomimetic alone (e.g., naphazoline 0.01%). They are useful in reducing redness in the eye but do not treat the underlying pathology that is causing the eye to be red. They should be limited to short-term use to avoid rebound effects. Like all sympathomimetics, they can interact with monoamine oxidase inhibitors and should not be used by patients receiving such treatment or within 14 days of ceasing therapy.

Otrivine-Antistin

Used in adults and children older than 12 years, the dosage is one or two drops two or three times a day. Patients with narrow-angle glaucoma should avoid this product because of the potential of the antihistamine component to increase IOP. Nosebleeds, local transient irritation and a bitter taste after application have been reported.

Naphazoline (e.g., Murine Irritation and Redness Relief Eye Drops and Murine Bright and Moist Eyes; Optrex Bloodshot Eyes Eye Drops)

The use of products containing naphazoline is restricted to adults and children older than 12 years. One or two drops should be administered into the eye three or four times a day.

References

Chen, Y.-Y., Liu, A.-H. S., Nurmatov, U., van Schayck, O. C. P., & Kuo, I. C. (2023). Antibiotics versus placebo for acute bacterial conjunctivitis. *Cochrane Database System Review, 3*, CD001211.

HINTS AND TIPS BOX 4.1: EYE DROPS

Contact lens wearers	• Patients who wear soft contact lenses should be advised to stop wearing them while treatment continues and for 48 hours afterwards. This is because preservatives in the eye drops can damage lenses.
Chloramphenicol drops	• These must be stored in the refrigerator. If they are put into the eye cold, it will be uncomfortable. Patients should be told to remove them from the refrigerator before use to allow them to warm up to room temperature.
Administration of eye drops	1. Wash your hands. 2. Tilt your head backwards until you can see the ceiling. 3. Pull down the lower eyelid by pinching outwards to form a small pocket and look upwards. 4. Hold the dropper in the other hand as near as possible to the eyelid without touching it. 5. Place one drop inside the lower eyelid and then close your eye. 6. Wipe away any excess drops from the eyelid and eye eyelashes with the clean tissue. 7. Repeat steps 2–6 if more than one drop needs to be administered. 8. Wash your hands.
Administration of eye ointment	1. Repeat eye drop steps 1 and 2. 2. Pull down the lower eyelid. 3. Place a thin line of ointment along the inside of the lower eyelid. 4. Close your eye and move your eyeball from side to side. 5. Wipe away any excess ointment from your eyelids and eyelashes using a clean tissue. 6. After using ointment, vision may be blurred but will soon clear by blinking.

Further reading

Chen, J. Y., & Tey, A. (2014). GP guide to the diagnosis and management of conjunctivitis. *The Prescriber, 25*, 22–31.

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Websites

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Eyecare Trust. http://www.eyecaretrust.org.uk/index.php

International Glaucoma Association. http://www.glaucoma-association.com

The Royal College of Ophthalmologists. https://www.rcophth.ac.uk

Uveitis Information Group. http://www.uveitis.net

Eyelid disorders

Background

A number of disorders can afflict the eyelids, ranging from mild dermatitis to malignant tumours. In the context of community pharmacy consultations, the most common presenting conditions are blepharitis and styes.

Prevalence and epidemiology

Data on the incidence or prevalence of eyelid disorders are limited. However, blepharitis has been reported to account for 5% of primary care ophthalmic consultations.

Aetiology

Blepharitis has staphylococcal, seborrhoeic or meibomian gland dysfunction aetiologies. Further classification of blepharitis is sometimes used based on its anatomic location. For example, anterior blepharitis refers to staphylococcal and seborrhoeic causes because they primarily affect the bases of the eyelashes. Posterior blepharitis refers to meibomian gland dysfunction because these are situated on the posterior eyelid. Patients, however, show overlapping signs and symptoms that suggest a mixed aetiology. Styes are caused by bacterial infection (staphylococcal in 90–95% of cases) and can be internal or external. External styes occur on the outside surface of the eyelid and are caused by an infected gland, the Zeis gland (a type of sebaceous gland) or the gland of Moll (a type of sweat gland), both of which are located near the base of the eyelashes. An internal hordeolum is a secondary infection of the meibomian gland in the tarsal plate. Occasionally, internal styes can evolve into a chalazion, a granulomatous inflammation that develops into a painless lump.

Table 4.6
Causes of eyelid disorders and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	Blepharitis Hordeola
Likely	Dermatitis
Unlikely	Chalazion Dacryocystitis Ectropion Entropion Molluscum contagiosum
Very unlikely	Carcinoma Orbital cellulitis

Table 4.7
Specific questions to ask the patient: The eyelid

Question	Relevance
Age	Molluscum contagiosum is seen in young children Blepharitis, entropion or ectropion and malignancy are associated with increasing age
Presence of pain	Styes, dacryocystitis and orbital cellulitis cause localised pain
Duration	Acute causes tend to suggest infection Chronic symptoms are more suggestive of blepharitis, entropion or ectropion and malignancy
Lid involvement	If most of the eyelid margin is involved, this suggests blepharitis Styes tend to show localised eyelid involvement
Eye involvement	Conjunctivitis is a common complication in blepharitis

Arriving at a differential diagnosis

Although blepharitis and styes are the most likely presentations, other problems affecting the eyelids need to be considered (Table 4.6). These should be relatively straightforward to recognise as long as a careful history, eye examination and appropriate questioning are undertaken (Table 4.7).

Clinical features of blepharitis

Typically, blepharitis is bilateral with symptoms ranging from irritation, itching and burning of the eyelid margins. eyelid margins may appear red and raw, accompanied by excessive tearing and crusty debris or skin flakes around the eyelashes. Symptoms also tend to be worse in the mornings, and patients might complain of eyelids being stuck together (see Fig. 4.10). Symptoms are often intermittent, with exacerbations and remissions occurring over long periods. The mean age of occurrence is 50 years of age. In chronic cases, madarosis (missing eyelashes) and trichiasis (in-turned eyelash) can occur. This latter symptom can lead to further local irritation and result in conjunctivitis. A seborrhoeic aetiology is likely if greasy crusting of the eyelashes and oily scale predominate compared with eyelash loss or misdirection, which suggests a staphylococcal cause.

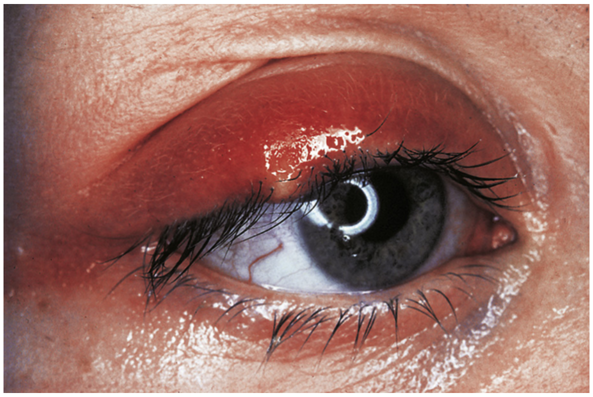

Fig. 4.15 External stye. (From Kanski J. J. [2007]. *Clinical ophthalmology: A systematic approach* [6th ed.]. Butterworth Heinemann.)

Clinical features of styes

Styes present as acute, painful, localised eye swelling on the eye eyelid margin that develops over a few days. If external, the stye presents as a swollen upper or lower eyelid, which is painful and sensitive to touch. A small yellow pus-filled lesion may be visible. The lesion will then spontaneously shrink and resolve or burst over the next few days (Fig. 4.15). Symptoms of internal styes are similar to those of an external stye, with pain, redness and swelling being present, although pain is often more severe, and pus-filled lesions are not obvious because of inward growth. If the eyelid is everted, localised swelling should be visible.

Conditions to eliminate

Likely causes

Dermatitis (atopic, contact, seborrhoeic)

Many products, especially cosmetics, can be sensitizing and result in itching and flaking skin that mimics blepharitis. The patient should be questioned about recent use of such products to allow dermatitis to be eliminated. Additionally, systemic atopy or atopic dermatitis can manifest on the eyelid, causing erythema, scaling and itch. The adult form of seborrhoeic dermatitis can also affect the eyelids, causing local redness, swelling, itching and skin flaking. It is unusual for only eyelid involvement to occur in both forms, with other sites usually affected.

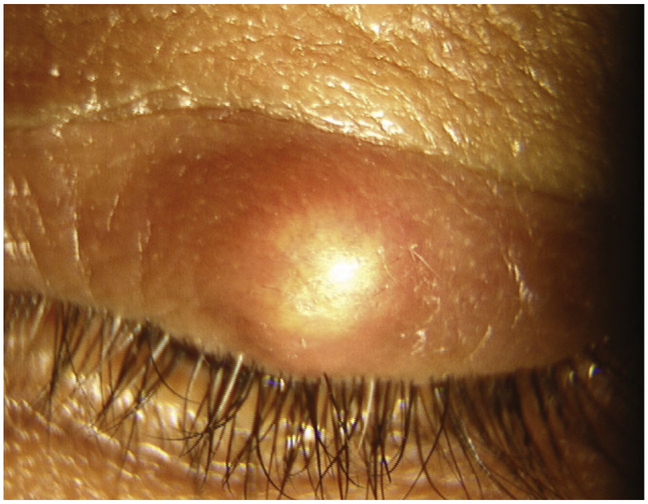

Fig. 4.16 Chalazion. (From Tandon, R. [2023]. *Parsons' diseases of the eye* [24th ed.]. Elsevier.)

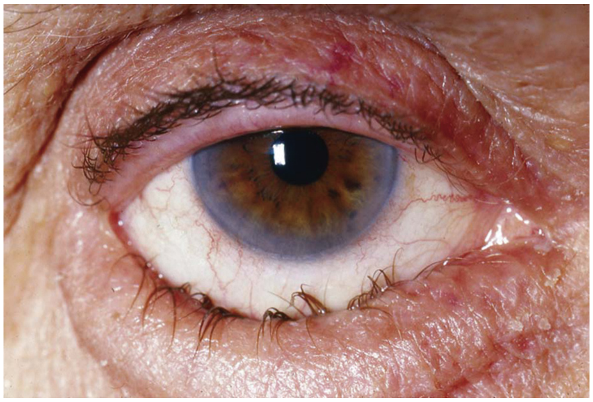

Fig. 4.17 Entropion. (From Palay D., & Krachmer, J. [2005]. *Primary care ophthalmology* [2nd ed.]. Elsevier Mosby.)

Unlikely causes

Chalazion

A chalazion is a noninfectious mass that results from obstruction of the meibomian gland. It develops over a number of weeks and initially can cause discomfort but becomes painless (Fig. 4.16). A lump should be clearly visible if the eyelid is everted. Associated blepharitis is frequently present. It is most often seen in people between 30 and 50 years of age. A chalazion is self-limiting, although it might take a few weeks to resolve completely. No treatment is needed unless the patient complains that it is particularly bothersome and is affecting their vision. Referral in these cases is needed for surgical removal.

Dacryocystitis

In acute dacryocystitis, the area around the tear sac is painful, red and swollen. The area around the eye may become red and watery and may ooze pus. Because drainage is affected, there is excessive tearing from the eye. If it becomes chronic, then the tear sac may bulge, and conjunctivitis can be present.

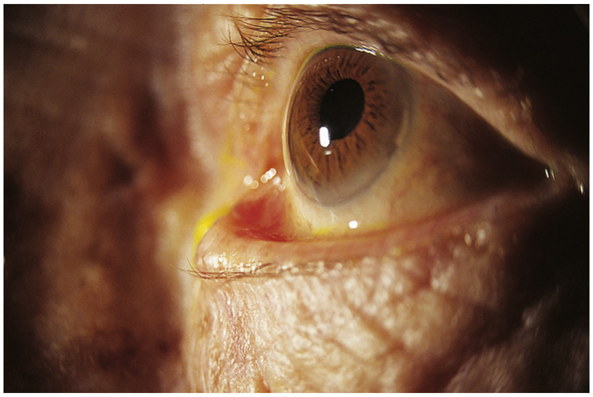

Fig. 4.18 Ectropion. (From Kanski, J. J. [2007]. *Clinical ophthalmology: A systematic approach* [6th ed.]. Butterworth Heinemann.)

Entropion

Entropion is defined as an inversion of the eyelid margin. It can be unilateral or bilateral, with the lower eyelid more frequently affected. The in-turning of the eyelid causes the eyelashes to be pushed against the cornea, resulting in ocular irritation and conjunctival redness (Fig. 4.17). A white mucoid discharge is also sometimes seen. It is most often seen in older adults because of aging changes making the musculature laxer. Referral is needed for surgical repair to correct the problem. Taping down the lower eyelid to draw the eyelid margin away from the eye is sometimes used as a temporary solution.

Ectropion

Ectropion is the converse of entropion; the eyelid turns outward, exposing the conjunctiva and cornea to the atmosphere (Fig. 4.18). Patients often present complaining of a continually watering eye. Paradoxically, this can lead to dryness of the eye because the eye is not receiving adequate lubrication. Ectropion is also seen with advancing age and often is noted in people who have Bell's palsy.

Molluscum contagiosum

This is typically seen in preschool children. It frequently involves the face and rarely includes the eyelids. The trunk and extremities are more often affected, and it is likely that these areas will be involved in addition to facial involvement. Lesions appear in crops and appear as pink pearl-like spots usually smaller than 0.5 cm in diameter. All lesions have a central punctum that is a diagnostic feature.

Very unlikely causes

Orbital cellulitis

Inflammation of the skin surrounding the orbit of the eye is usually a complication from a sinus infection, although in extreme cases of stye, the infection can spread to involve the entire eyelid and even the periorbital tissues. The patient will present with unilateral swollen eyelids, be unwell and might show restricted eye movements. This must be referred immediately because blindness is a potential complication.

Malignancy

Basal cell carcinoma (BCC) (90%) and squamous cell carcinoma (SCC) (5–10%) account for most malignancies of the eyelid (Fig. 4.19). Long-term exposure to the sun is the main cause. For further information on sun-induced skin damage, please see the section on sun damage in the Chapter 9.

Basal cell carcinoma

BCC usually appears on the lower eyelid. The lesion is firm and pearly with an elevated border. Telangiectasia may overlie the lesion and show central ulceration, which fails to heal. The lesion may bleed or itch but is rarely painful. If located along the eyelid margin, eyelashes may be missing in the region of the lesion.

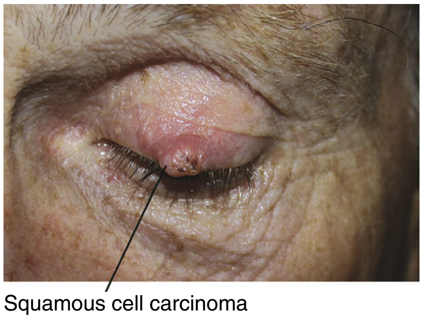

Fig. 4.19 Carcinoma. (From *The Massachusetts Eye and Ear Infirmary illustrated manual of ophthalmology* [4th ed.]. 2014.)

Squamous cell carcinoma

Lesions present similarly to BCCs but occur frequently on the upper eyelid. They appear erythematous, raised with a rough surface and centrally ulcerated. They can cause pain. SCC is quicker growing and more aggressive than BCC.

Red flags indicative of referral: Eyelid disorders

Reason for referral	Why referring	Timeframe for referral
• Chalazion that becomes bothersome to the patient	• May need surgical intervention	• As soon as practicable
• Inward or outward turning of the lower eyelid	• Requires medical intervention	
• Patient with swollen eyelids and associated feelings of being unwell	• Suggests orbital cellulitis	• Immediate to emergency department
• Middle-aged or older patient with painless nodular lesion on or near the eyelid	• Suggests sinister pathology, possibly malignancy	• Urgent
• Blepharitis unresponsive to therapy	• Suggests misdiagnosis or the need for antibiotics	• As soon as practicable

Evidence base for over-the-counter medication

OTC medication is generally not required for blepharitis or styes. No specific products are available, and both conditions respond well to conservative treatment.

Practical prescribing and product selection

Blepharitis

The mainstay of treatment for blepharitis is improved eyelid hygiene. The eyelids should be cleaned using a diluted mixture of baby shampoo (1:10) with warm water that is applied to the eyelids using a cotton bud. This should be done twice daily initially and can be reduced to once daily if symptoms improve. In addition, a warm compress should be applied to closed eyelids for 5 to 10 minutes once or twice daily.

Styes

Although styes are caused by bacterial pathogens, the use of antibiotic therapy is not usually needed unless there are signs of spreading. A warm compress applied for 5 to 10 minutes up to four times a day can bring an external stye to a head; after it bursts, the pain will subside, and the symptoms will resolve.

Further reading

Carlisle, R. T., & Digiovanni, J. (2015). Differential diagnosis of the Swollen Red Eyelid. *American Family Physician, 92*, 106–112.

Cronau, H., Kankanala, R. R., & Mauger, T. (2010). Diagnosis and management of red eye in primary care. *American Family Physician, 81*, 137–144.

Lindsley, K., Matsumura, S., Hatef, E., & Akpek, E. K. (2012). Interventions for chronic blepharitis. *Cochrane Database System Review, 5*, CD005556.

Dry eye syndrome (dry eye disease or keratoconjunctivitis sicca)

Background

Dry eye is a frequent cause of eye irritation, causing varying degrees of discomfort. The condition is chronic, with no cure.

Table 4.8
Causes of dry eye and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	Dry eye syndrome
Likely	Blepharitis Medicine-induced dry eye
Unlikely	Ectropion Eyelid abnormality or dysfunction leading to exposure (exposure keratopathy) Rosacea Systemic diseases ○ Sjögren's syndrome ○ Rheumatoid arthritis ○ Lupus ○ Thyroid disease
Very unlikely	Bell's palsy Nocturnal lagophthalmos Ocular pemphigoid

Prevalence and epidemiology

The exact prevalence of dry eye is unclear because of a lack of consistency in its definition coupled with few population-based studies, which used differing criteria for diagnosis. However, it is clear that dry eye syndrome is common. Its prevalence increases with increasing age and is more common in females than males.

Aetiology

Dry eye syndrome is a multifactorial ocular surface disease. It is caused by tear film instability that leads to a loss of homeostasis of the tear film. Environmental and patient factors can result in the instability of the tear film increasing electrolyte concentrations, resulting in dry eye.

Arriving at a differential diagnosis

A number of conditions can cause dry eye (Table 4.8), and dry eye–specific questions can be asked to help determine the diagnosis (Table 4.9).

Clinical features of dry eye syndrome

It is characterised by reduction in the quality or quantity of tears and manifests with a range of symptoms, which include dry, tired irritated eyes accompanied by epiphora, varying degrees of pain or discomfort and redness of eyelids or conjunctiva with intermittent blurry vision. Typically, symptoms fluctuate in intensity and are intermittent, with symptom severity not always correlating with clinical signs. A number of validated questionnaires are available (e.g., Dry Eye Questionnaire [DEQ-5]) that may be useful in assessing dry eye symptoms (see website listing).

Conditions to eliminate

Likely causes

Blepharitis

Typically, blepharitis is bilateral with symptoms ranging from irritation, itching and burning of the eyelid margins. Please refer to the discussion of eyelid disorders for a fuller description of its presentation.

Medicine-induced dry eye

A number of medicines can exacerbate or produce side effects of dry eyes because of decreased tear production (Table 4.10). If medication is suspected, the pharmacist should contact the patient's doctor to discuss possible alternative therapies to alleviate the problem.

Unlikely causes

Ectropion

Sometimes the lower eyelid turns outward. This overexposes the conjunctiva to the atmosphere, leading to eye dryness. For further information, see the discussion under eyelid disorders.

Table 4.9
Specific questions to ask the patient: Dry eye syndrome

Question	Relevance
Have you had daily, persistent, troublesome dry eyes for more than 3 months? Do you have a recurrent sensation of sand or gravel in the eyes?	A positive response to at least one of these questions indicates dry eye syndrome.
Medical history	A number of autoimmune conditions are associated with symptoms of dry eye.
Aggravating factors	Dry eyes are worsened by dry air, wind, dust and smoke.
Associated symptoms	Normally no other symptoms are present in dry eye syndrome.
Number of tears produced	If the patient complains of watery eyes but states that the eyes are dry and sore, check for ectropion.

Table 4.10
Medications that can cause dry eye

Diuretics
Drugs that have an anticholinergic effect (e.g., tricyclic antidepressants, antihistamines)
Isotretinoin
Hormone replacement therapy, particularly oestrogen alone
Androgen antagonists
Cardiac arrhythmic drugs, beta blockers
Selective serotonin reuptake inhibitors

Rosacea

Rosacea is a disease of the skin characterised by facial skin findings, including erythema, telangiectasia, papules and pustules that mimic acne vulgaris, although many patients also have marginal blepharitis and dry eyes (Fig. 4.20).

Systemic disease

Sjögren's syndrome is an autoimmune disease and usually appears in middle-aged to older adults. Salivary and lacrimal glands are commonly affected, so dry mouth and dry eyes are usually experienced. Symptoms closely mimic dry eye syndrome, although symptoms tend to be more severe. Some people experience tiredness and muscle and joint pain.

Rheumatoid arthritis is a chronic inflammatory disease that primarily affects the joints but also other parts of the body, including the eyes. The most common symptom is dryness.

Lupus is an autoimmune disease that causes widespread inflammation and tissue damage. Patients may therefore experience a variety of symptoms, but common symptoms include fatigue, headaches, skin rash (e.g., butterfly-shaped rash on the cheeks), fever and pain or swelling in the joints. Dry eye is found in about one-third of all patients.

Eye symptoms are very common in *thyroid disease* and include dry, watery and red eyes. In addition, hyperthyroidism, bulging eyes, double vision, difficulty closing the eyes and reduction in visual acuity can be experienced. Other classic symptoms of thyroid disease include weight changes, heat intolerance, fatigue and anxiety.

Very unlikely causes

Bell's palsy

Bell's palsy is characterised by unilateral facial paralysis, often with a sudden onset. A complication of Bell's palsy is that the patient might be unable to close one eye or blink, leading to decreased tear film and dry eye.

Nocturnal lagophthalmos

Nocturnal lagophthalmos is the inability to close the eyelids during sleep. Symptoms are most obvious on waking and tend to gradually improve during the day. Patients experience soreness or dryness in one or both eyes, often associated with watering. Blurred vision and eye redness may also be present.

Ocular pemphigoid

This is a rare autoimmune disease that damages the conjunctiva. It usually affects both eyes. Early symptoms are conjunctivitis that can become persistent. Dryness of the eye and trichiasis are common.

Red flags indicative of referral: Dry eye

Reason for referral	Why referring	Timeframe for referral
• Associated dryness of mouth and other mucous membranes	• Possibly Sjögren's syndrome	• As soon as practicable
• Difficulty closing the eyes	• Possibly thyroid problem, nocturnal lagophthalmos	
• Associated skin rash	• Suggests rosacea or lupus	
• Out-turning lower eyelid	• Suggests ectropion and requires medical intervention	

Evidence base for over-the-counter medication

Dry eyes are managed by the instillation of artificial tears and lubricating ointments. Products in the United Kingdom consist of hypromellose, polyvinyl alcohol, carmellose, carbomer 980, sodium hyaluronate and wool fats. Despite a lack of published trial data, hypromellose products have been in use for more than 50 years. They possess film-forming and emollient properties but unfortunately do not have ideal wetting characteristics, which results in up to hourly administration to provide adequate relief. This disadvantage of frequent installation has led to the development of other products. Polyvinyl alcohol 1.4% acts as a viscosity enhancer. At this concentration, the product has the same surface tension as normal tears, lending optimal wetting characteristics and hence potentially less frequent dosing, typically four times a day. Similar to hypromellose, there is a lack of published data confirming efficacy.

Carbomer has been shown to be more efficacious than placebo and as safe as, but better tolerated, than polyvinyl alcohol (Brodwall et al., 1997). In a comparison study between two proprietary brands, Viscotears and GelTears, both were found to be equally

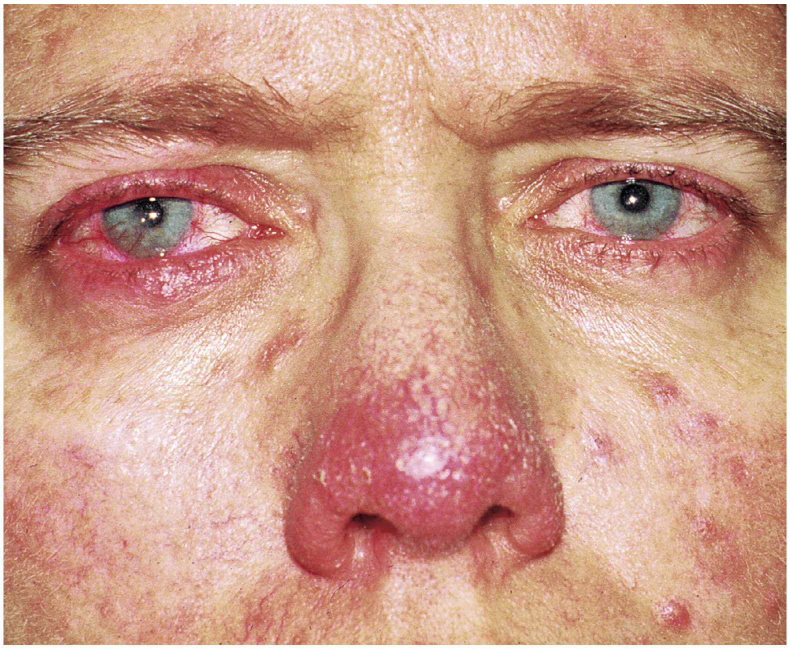

Fig. 4.20 Rosacea. (From *Cornea atlas* [2nd ed.]. 2006.)

Table 4.11
Practical prescribing: Summary of medicines for dry eye

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients for whom care is exercised	Pregnancy and breastfeeding
Hypromellose, carmellose	Dry eye in children rare; therefore, should be referred	Transient stinging or burning reported; blurred vision after instillation of carbomer and polyvinyl alcohol	None	None	OK
Carbomer 940					
Polyvinyl alcohol		None			
Wool fats					
Hyaluronate					

effective, although neither was significantly better than the other (Bron et al., 1998). Sodium hyaluronate has been subject to a number of trials that have shown a reduction in symptom severity. It has also been compared with carbomer products and carboxymethylcellulose and found to be equally effective (Lee et al., 2011).

Summary

Evidence of superior efficacy among any of the ophthalmic lubricants is lacking. The choice is based on patient acceptability and adherence as well as sensitivity or allergy to preservatives contained in the product. Hypromellose is often used as first-line treatment for most cases of acute dry eye.

Practical prescribing and product selection

Prescribing information relating to medications for dry eye is discussed and summarised in Table 4.11, and useful tips on medication are given in 'Hints and tips' Box 4.2.

The dosage of all products marketed for dry eye is largely dependent on the patient's need for lubrication and is therefore given on an as-needed basis. All products are pharmacologically inert, and none are known to interact with any medicine, only cause minimal and transient side effects, so they can be given to all patient groups.

HINTS AND TIPS BOX 4.2: DRY EYE

Preservatives in eye drops	• Many eye drops contain benzalkonium chloride, which can cause eye irritation. If symptoms persist or are worsened by the eye drops, it may be worth trying a preservative-free formulation or single-dose unit preparations.

Hypromellose and carmellose

Hypromellose 0.3% is widely available but is also available at higher concentrations (e.g., 0.5%); carmellose is available at 0.5% or 1.0% concentration. All might require hourly or even half-hourly dosing initially, which should reduce as symptoms improve.

Polyvinyl alcohol

Three proprietary products are available, Liquifilm Tears, Refresh Ophthalmic and Sno Tears. Liquifilm is also available as a unit-dose preservative-free formulation.

Carbomer

Manufacturers recommend that adults and older adults use one drop three or four times a day or as required, depending on patient need. Because of the products' viscosity properties, carbomer (e.g., Artelac Nighttime, Clinitas, GelTears, Liquivisc, Viscotears) should be used last if other eye drops need to be instilled. Manufacturers advise avoidance in pregnancy and lactation because of insufficient data. Clinical experience, however, has shown that carbomer can be used safely in these patient groups.

Lubricants

Wool fats

These products contain a mixture of white soft paraffin, liquid paraffin, and wool fat (e.g., Lacri-Lube). They are useful at bedtime when prolonged lubrication is needed, but because they blur vision, they are unsuitable for use during the day.

Sodium hyaluronate

The dosage for all products containing sodium hyaluronate (regardless of strength) is on an as-needed basis.

References

Brodwall, J., Alme, G., Gedde-Dahl, S., et al. (1997). A comparative study of polyacrylic acid [Viscotears] liquid gel versus polyvinyl alcohol in the treatment of dry eyes. *Acta Ophthalmologica Scandinavica, 75*, 457–461.

Bron, A. J., Daubas, P., Siou-Mermet, R., et al. (1998). Comparison of the efficacy and safety of two eye gels in the treatment of dry eyes: Lacrinorm and Viscotears. *Eye, 12*, 839–847.

Lee, J. H., Ahn, H. S., Kim, E. K., et al. (2011). Efficacy of sodium hyaluronate and carboxymethylcellulose in treating mild to moderate dry eye disease. *Cornea, 30*, 175–179.

Further reading

Chalmers, R. L., Begley, C. G., & Caffery, B. (2010). Validation of the 5-item dry eye questionnaire (DEQ-5): Discrimination across self-assessed severity and aqueous tear deficient dry eye diagnoses. *Contact lens & Anterior Eye: The Journal of the British Contact Lens Association, 33*, 55–60.

Websites

The British Sjögren's Syndrome Association. https://www.bssa.uk.net

Sjogren's foundation. https://sjogrens.org

Self-assessment questions

The following questions are intended to supplement the text. Two levels of questions are provided, multiple-choice questions and case studies. The multiple-choice questions are designed to test knowledge and the application of knowledge, and the case studies allow this to be put in context in patient scenarios.

Multiple-choice questions

4.1. A middle-aged female presents to the pharmacy with a red left eye. The redness appeared quite quickly, and she has no other symptoms. Based on this information, what is the most likely diagnosis?

- **a.** Allergic conjunctivitis
- **b.** Bacterial conjunctivitis
- **c.** Episcleritis
- **d.** Keratitis
- **e.** Subconjunctival haemorrhage

4.2. A male in his late 40s presents to the pharmacy with a red right eye. The redness appeared a day or so ago, and he says the feeling is uncomfortable. He says he has not noticed any discharge but mentions his eye is watering more than usual. Based on this information, which ONE of the following is the most likely diagnosis?

- **a.** Scleritis
- **b.** Uveitis
- **c.** Keratitis
- **d.** Viral conjunctivitis
- **e.** Glaucoma

4.3. A female in her late 30s presents with a red left eye. She says the eye has been red for a little while (at least 2 weeks) but that it has not been bothering her; however, she would like to get rid of the redness before attending a work party. Which ONE of the following is the most likely diagnosis?

- **a.** Allergic conjunctivitis
- **b.** Episcleritis
- **c.** Scleritis
- **d.** Blepharitis
- **e.** Subconjunctival haemorrhage

4.4. Red eye is a common presenting symptom. Based solely on epidemiology, which ONE of the conditions listed below is *least* likely to be seen in a community pharmacy?

- **a.** Episcleritis
- **b.** Glaucoma
- **c.** Scleritis
- **d.** Subconjunctival haemorrhage
- **e.** Viral conjunctivitis

4.5. Mr Simmonds, a 54-year-old, presents with a red right eye. He has had the symptoms for 1 week or so. He is complaining of photophobia and takes methotrexate for rheumatoid arthritis. Which ONE of the following is the most likely diagnosis?

- **a.** Scleritis
- **b.** Episcleritis
- **c.** Uveitis
- **d.** Glaucoma
- **e.** Keratitis

4.6. Priya Patel, a 27-year-old female, presents with bilateral red eyes of 3 days' duration. She complains also of slight discharge. Visual examination reveals nothing untoward. Your differential diagnosis is conjunctivitis. Which ONE of the following symptoms help(s) to differentiate allergic conjunctivitis from bacterial and viral conjunctivitis?

- **a.** She also has nasal congestion.
- **b.** Redness is distributed throughout the conjunctiva.
- **c.** She complains of itching eyes.
- **d.** Discharge is mucopurulent.
- **e.** Symptoms were sudden in onset.

4.7. A patient presents with the following symptoms. There is a bright red patch in the eye, which appeared overnight. There is no recent history of trauma to the eye. There is no pain or discomfort, and there is no discharge from the eye. Vision is normal, and there is no evidence of photophobia. Which ONE of the following is the most likely diagnosis for this set of symptoms?

- **a.** Subconjunctival haemorrhage
- **b.** Uveitis
- **c.** Episcleritis
- **d.** Keratitis
- **e.** Viral conjunctivitis

4.8. A middle-aged female presents with a history of a red left eye for the past 24 hours. Which ONE of the following symptoms should alert you to potential sinister pathology?

- **a.** Discomfort in the eye
- **b.** Generalised scleral redness
- **c.** Irregular pupil
- **d.** Redness located in the fornices
- **e.** Mucopurulent discharge

4.9. The mother of a young female (8 years old) asks you to look at her daughter's sore left eye. On examination, you notice that her eyelid is slightly swollen, and her eye is a little red and tender to the touch. Which ONE of the following is the most likely diagnosis?

a. Blepharitis
b. Bacterial conjunctivitis
c. Stye
d. Chalazion
e. Entropion

4.10. Mr Singh, a 76-year-old male, asks to speak with the pharmacist. He has a sore right eye. He says that his eye is watering and irritating. The symptoms have been present for quite some time. The eye examination is normal. Based on this information, which ONE of the following is the most likely diagnosis?

a. Blepharitis
b. Conjunctivitis
c. Dry eye syndrome
d. Entropion
e. Stye

4.11. Mrs Bradley comes into your pharmacy to ask about treatment for an infected eye. For OTC treatment of acute bacterial conjunctivitis, which ONE of the following regimens should be recommended for chloramphenicol eye drops, 0.5%?

a. Apply one drop four times a day. The duration of treatment is 7 days.
b. Apply one drop every 2 hours for 2 days and then four times a day thereafter. The duration of treatment is 5 days.
c. Apply two drops four times a day. The duration of treatment is 5 days.
d. Apply one drop every 4 hours for 3 days and then four times a day. The duration of treatment is 7 days.
e. Apply one drop every 4 hours for 2 days and then four times a day. The duration of treatment is 5 days.

4.12. Mrs Sykes, a 52-year-old female, presents with a bright red left eye that she noticed the previous day. Which ONE of the symptom clusters would you most likely think warrants referral to an optician?

a. Slight eye discomfort but no discharge, with vision unaffected
b. Slight pain with little discharge and vision unaffected
c. Slight pain with little discharge and blurred vision caused by tearing
d. Slight pain with mucopurulent discharge and vision unaffected
e. Moderate pain with slight discharge and vision unaffected

4.13. Mr X presents one evening to the pharmacy with symptoms of blurred vision and eye pain. Which ONE of the following is the most likely diagnosis?

a. Episcleritis
b. Glaucoma
c. Keratitis
d. Uveitis
e. Viral conjunctivitis

4.14. Mrs Beattie, a 65-year-old female, asks to speak with the pharmacist. She says that both her eyes are sore and feel itchy and watery. The symptoms have been present for quite some time. The eye examination is normal. Based on this information, which ONE of the following is the most likely diagnosis?

a. Blepharitis
b. Dry eye syndrome
c. Conjunctivitis
d. Stye
e. Entropion

4.15. Mrs Jenkins asks for your advice. She tells you that she was gardening 2 days ago when a branch went into her right eye. Since then, she has experienced severe pain, with a watery discharge. On inspecting her eye, you see redness around the iris and a small pupil. Which ONE of the following conditions is this most likely to be?

a. Subconjunctival haemorrhage
b. Uveitis
c. Keratitis
d. Viral conjunctivitis
e. Episcleritis

Questions 4.16 to 4.20 concern the following conditions:

A. Allergic conjunctivitis
B. Bacterial conjunctivitis
C. Viral conjunctivitis
D. Subconjunctival haemorrhage
E. Episcleritis

Select, from A to E, which of these conditions:

4.16. Shows redness greatest in the fornices

4.17. Is bilateral and discomfort is described as itching

4.18. Is usually sudden in onset unilateral and painless

4.19. Affects females more than males

4.20. Is associated with other symptoms such as cough

Questions 4.21 to 4.25 concern the following symptoms:

A. Painful upper eyelid
B. Painless lump on the upper eyelid
C. Unilateral swollen eyelid
D. Burning of eyelid margins
E. In-turning eyelid
F. Out-turning eyelid
G. Pain and swelling over the lacrimal sac

Select, from A to G, which of these symptoms is most closely associated with which condition:

4.21. Stye

4.22. Orbital cellulitis

4.23. Blepharitis

4.24. Carcinoma

4.25. Entropion

Answers

4.1. Answer: e

Rationale: Allergic (a) and bacterial (b) conjunctivitis are bilateral; the other three are unilateral, but keratitis (d) is painful. This leaves a choice between episcleritis (c) and subconjunctival haemorrhage (e). Given that symptoms appeared quickly, e is the most likely.

4.2. Answer: d

Rationale: All options, other than d, present with true eye pain rather than discomfort.

4.3. Answer: b

Rationale: Because the eye is not causing any discomfort, the options listed that are plausible are episcleritis (b) and subconjunctival haemorrhage (e). Based on duration, b is more likely than e.

4.4. Answer: b

Rationale: Sinister causes of red eye are relatively uncommon. Options a (episcleritis), d (subconjunctival haemorrhage) and e (viral conjunctivitis) are likely to be seen routinely by community pharmacists. This leaves a choice between b (glaucoma) and c (scleritis) as the right answer. Scleritis is rare, but an acute presentation of glaucoma constitutes the most unusual case that a pharmacist would see.

4.5. Answer: c

Rationale: Photophobia is a symptom of few ocular conditions seen by pharmacists. From the list of options, this only occurs in uveitis (c) and keratitis (e). However, there is an association with uveitis and autoimmune disease. Therefore, uveitis (c) is most likely in this case.

4.6. Answer: c

Rationale: Nasal congestion (a) is not associated with allergic conjunctivitis but could be seen in viral conjunctivitis. Redness distribution (b) can be helpful, but generalised redness is associated with bacterial and viral causes. Discharge (d) can suggest bacterial conjunctivitis but is not useful for confirming allergic conjunctivitis. Sudden-onset conjunctivitis (e) is more useful in bacterial and viral causes. Itching eyes is classically associated with allergic conjunctivitis.

4.7. Answer: a

Rationale: Painless red eye, from the options listed, can only be subconjunctival haemorrhage (a) or episcleritis (c). Because this was sudden in onset, the cause is likely to be option a.

4.8. Answer: c

Rationale: All acute self-limiting causes of red eye have normal pupil reactions and shape. Therefore, option c (irregular pupil) is the correct answer.

4.9. Answer: c

Rationale: The most likely condition in this age group is either bacterial conjunctivitis (b) or stye (c). Because she has local pain associated with her eyelid, stye is the most likely condition based on the symptoms listed.

4.10. Answer: c

Rationale: Entropion (d), blepharitis (a) and dry eye syndrome (c) can all cause excessive tearing. However, an eye examination would generally show other symptoms of redness and skin flaking in blepharitis (a). Because the eye examination is normal, this tends to rule out entropion. Dry eye syndrome seems the most likely diagnosis even though only one eye is affected. Supporting this is that Mr Singh's age also fits with this diagnosis.

4.11. Answer: b

Rationale: The dosing schedule for option b is in accordance with product license for chloramphenicol.

4.12. Answer: e

Rationale: True eye pain should be referred for further evaluation, but pain is subjective. Slight eye pain is, in most cases, manageable in the pharmacy. In this case, only option e warrants referral.

4.13. Answer: b

Rationale: Viral conjunctivitis (e) and episcleritis (a) can be discounted because neither is painful nor causes blurred vision. All others cause pain, but keratitis (c) and uveitis (d) are least associated with blurred vision compared with glaucoma (b), which also occurs frequently in the evening.

4.14. Answer: b

Rationale: The bilateral presentation rules out stye (d) and entropion (e). No signs of conjunctival redness also rule out conjunctivitis (c). The description could be either blepharitis (a) or dry eye syndrome (b). Because the eye examination is normal, this points to (b) more than a because one would expect to see skin debris or eyelash deformities in blepharitis.

4.15. Answer: c

Rationale: Subconjunctival haemorrhage (a) and episcleritis (e) are painless; viral conjunctivitis (d) causes discomfort but not pain. This leaves uveitis (b) and keratitis (c) as an option, both of which cause pain. Pupil changes occur in but uveitis shows an irregular shaped pupil compared with a small pupil in keratitis.

4.16. Answer: a

Rationale: Allergic rhinitis (a) shows redness in the fornices because pollen is washed into the corner of the eyes, causing local direct irritation. Bacterial (b) and viral (c) rhinitis can show generalised redness; subconjunctival haemorrhage (d) and episcleritis (e) show segmental redness.

4.17. Answer: a

Rationale: Bilateral involvement is associated with options a, b and c, the three forms of conjunctivitis commonly seen in community pharmacy. Bacterial (b) and viral (c) are described as discomfort rather than itching.

4.18. Answer: d

Rationale: From 4.17, only subconjunctival haemorrhage (d) and episcleritis (e) should be considered. Both tend to be painless, but subconjunctival haemorrhage is associated with an abrupt onset.

4.19. Answer: e

Rationale: All forms of conjunctivitis (a–c) and subconjunctival haemorrhage show no gender differences.

4.20. Answer: c

Rationale: Bacterial conjunctivitis (b), subconjunctival haemorrhage (d) and episcleritis (e) have no other associated symptoms. Allergic conjunctivitis (a) and viral conjunctivitis (c) can show other symptoms; allergic conjunctivitis can have nasal symptoms but not cough.

4.21. Answer: a

Rationale: Styes tend to cause localised pain. Given the options, b and d through g can be excluded, leaving painful upper eyelid (a) and unilateral swollen eyelid (c) as possible viable options. Based on the information given, a is a better fit than c.

4.22. Answer: c

Rationale: Orbital cellulitis causes swelling and based on this symptom; only c is a viable option.

4.23. Answer: d

Rationale: Blepharitis involves the eyelid margins rather than the eyelids themselves. Based on this, the only viable option is d.

4.24. Answer: b

Rationale: Carcinomas affecting the eyes or eyelids tend to be slow-growing, insidious and painless. This means that options a, c, d and g can be excluded. Options e and f can also be excluded because they are a consequence of eyelid muscle pathology but not tumour growth.

4.25. Answer: e

Rationale: Physical changes are not seen with entropion, so options a to d and g can be ruled out. Option f is the opposite manifestation of eyelid pathology.

Case studies

CASE STUDY 4.1

Mrs J, a 32-year-old-female, presents to the pharmacy asking you for something to treat her red eye.

a. What are your initial thoughts on the problem based solely on the information given?

We know:

- *Person is an adult female*
- *Unilateral presentation*
- *Wants treatment*

We do not know:

- *Time course*
- *Key symptoms*
- *Any history of the presenting complaint or medical history of Mrs J*

b. What conditions need to be initially considered?

Common presentations of unilateral red eye in primary care are:

- *Bacterial conjunctivitis*
- *Subconjunctival haemorrhage*
- *Viral conjunctivitis*
- *Episcleritis (less common than the three listed above)*

c. Which questions should be asked to help differentiate between these four causes of red eye?

Question	*Usefulness*
Confirmation that only one eye is affected	Allows line of questioning to concentrate on the initial conditions postulated as the cause
When did she notice the redness in the eye?	Gives some reference point to onset. For example, subconjunctival haemorrhage is very abrupt on onset; episcleritis can last weeks; if symptoms been present for some days, then one would expect bilateral involvement in conjunctivitis
Presence of discharge	Seen in conjunctivitis but not others
Distribution of redness	Localised and segmental is typical in subconjunctival haemorrhage and episcleritis
Previous episodes	Viral conjunctivitis and episcleritis can recur, so there may be a history of recent red eye
Level of pain	Conjunctivitis associated with some degree of discomfort

You find out only her left eye is affected and has been red for about 1 day. Redness is generalised. Her eye is a little sore, and she keeps rubbing it. She denies any other symptoms and says this is the first episode of red eye she can remember.

d. What are your thoughts now on the differential diagnosis?

- *Bacterial conjunctivitis: possible*
- *Subconjunctival haemorrhage: unlikely*
- *Viral conjunctivitis: probable*
- *Episcleritis: unlikely*

e. What questions, if any, could be further asked to support your differential diagnosis of viral conjunctivitis?

- *Confirmation that there is no mucopurulent discharge (e.g., glued eyes that morning on wakening)*
- *Other symptoms present*

f. Mrs J wanted something to help her eye redness. No treatment is needed for viral conjunctivitis. How would you communicate this to Mrs J?

Write down the strategies you would use.

g. What safety netting information would you give Mrs J?

Viral conjunctivitis usually takes 7 days to resolve. Tell Mrs J that if redness has not resolved in that time to return so her symptoms can be reassessed. Also advise her that the redness is likely to move into her other eye because viral conjunctivitis is very infectious.

CASE STUDY 4.2

Ms BB, a 36-year-old female, asks you for something to help ease the soreness she is experiencing on her eyelids.

a. Based on her age, what problems are likely to be the cause of her sore eyelids?

- *Acne rosacea*
- *Dermatitis (atopic, contact, seborrhoeic)*
- *Hordeola*

b. Which questions would be useful to help differentiate these three conditions?

- *Which part of the eyelid(s) is affected?*
- *Localised versus widespread involvement?*
- *Does she have a history of skin rashes?*
- *Current or past history*
- *What cosmetics or cleansers does she use?*
- *Changes to routine? New products?*
- *Is there any eye involvement?*

You find out both eyelids seem inflamed, and there is a degree of eyelid margin redness. There appears to be little or minimal eye redness, and there are not any active skin lesions. Ms BB has had quite bad scalp dermatitis in the past on and off for a number of years, which is currently not an issue. She also tells you she has used the same makeup brands for the past few years and never had this problem before.

c. Based on this information, which of the conditions listed do you believe is most likely?

A form of dermatitis seems most likely, probably seborrhoeic given her history of scalp problems.

d. Are there any alternative conditions that now need to be considered?

Her symptoms are suggestive of blepharitis even though she is relatively young.

e. How could you best differentiate between dermatitis and blepharitis in this case?

In blepharitis, intermittent itching and watery eyes is usually present, which is less prominent with seborrheic dermatitis.

CASE STUDY 4.3

Mr B, a 60-year-old male, presents with a 2-day history of a red painful eye and asks for some drops to ease the discomfort.

a. What would be the first thing you would want to do in this situation?

An assessment as to the level of pain needs to be made. Although pain is a subjective thing, most ocular problems that cause true pain are associated with sinister pathology.

Mr B describes the pain as bothersome and more than just the sort of pain you get when you get grit in your eye.

This description should raise concern in your mind that you are probably dealing with an uncommon cause of red eye.

b. Which red eye problems present with true eye pain?

- *Acute closed-angle glaucoma*
- *Anterior uveitis*
- *Corneal abrasion/foreign body*
- *Keratitis (corneal ulcer)*
- *Scleritis*

c. Based on Mr B's symptoms, which of these conditions would be least likely?

- *Acute closed-angle glaucoma*

d. What further signs and symptoms will help to differentiate these conditions?

- *Visual changes*
- *Pupil changes*
- *Discharge*

You find out that he has some degree of photophobia, his pupil reflex is abnormal, and he has a watery discharge.

e. Based on these symptoms, what do you believe is the likely diagnosis?

Keratitis

Chapter 5

Ear conditions

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Background

Problems affecting the ear are a common presentation in primary care. Pharmacists are more likely to see causes affecting the external and middle ear because people with inner ear problems (hearing loss and dizziness) tend to seek help from general practitioners (GPs).

General overview of ear anatomy

The ear has dual function of hearing and balance and is anatomically divided into the outer, middle and inner ear.

External ear

The external ear consists of the pinna (Fig. 5.1) and the ear canal. Their function is to collect and transmit sound to the tympanic membrane (eardrum).

The pinna chiefly consists of cartilage and has a firm elastic consistency. The ear canal opens behind the tragus and curves inwards, approximately 3 cm; the inner two-thirds is bony, and the outer third cartilaginous. The skin lining the cartilaginous outer portion has a well-developed subcutaneous layer that contains hair follicles and ceruminous (secretes cerumen) and sebaceous glands. The combination of hairs and cerumen helps to prevent particulate matter and foreign bodies from entering the ear.

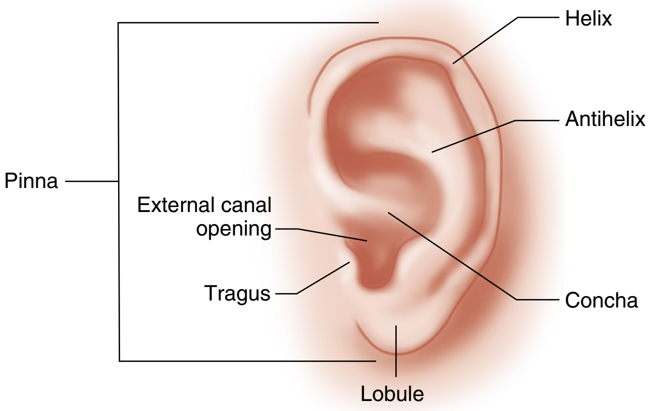
Helix
Antihelix
Pinna
External canal opening
Tragus
Concha
Lobule

Fig. 5.1 The pinna. (From Ignatavicius, D., Workman, M. L., & Rebar, C. [2018]. *Medical-surgical nursing* [9th ed.]. Saunders).

The two portions of the ear canal have slightly different directions; the outer cartilaginous portion is upwards and backwards, whereas the inner bony portion is forwards and downwards. This is important to know when examining the ear.

Middle ear

This consists of the tympanic cavity and contains the malleus, incus and stapes (known as the auditory ossicles; Fig. 5.2). These connect to form a mobile chain to join the tympanic membrane of the external ear to the oval window of the inner ear. The function of the auditory ossicles is to transmit and amplify the sound vibrations from the external ear to the inner ear.

The Eustachian tube connects the middle ear to the nasopharynx. This allows equalisation of pressure against the inner and outer surfaces of the tympanic membrane and helps to prevent membrane rupture and facilitates optimal transmission of sound waves. Because it connects to the pharynx, it does mean that pathogens can travel between the throat and the ear, especially in children because their tubes are shorter and straighter than in adults.

Inner ear

The inner ear is composed of two main parts, a bony labyrinth that encloses the membranous labyrinth (see Fig. 5.2). The bony labyrinth consists of the vestibule, cochlea and semicircular canals. Filling the membranous labyrinth is a clear fluid known as the endolymph, and surrounding the membranous labyrinth is the perilymph. On the floor of the cochlear duct lies the basilar membrane, which contains the organ of Corti. The vestibule and the semicircular canals are involved in balance and the cochlea in hearing.

History and physical examination

The person's presenting symptoms (Table 5.1) and a physical examination of the ear (Table 5.2) will point to which structure of the ear the problem originates from and therefore help to determine the cause.

Physical examination

Before performing an examination, explain to the patient what you want to do and gain their consent.

1. Wash your hands.
2. Inspect the external ear for redness, swelling and discharge
3. Apply pressure to the mastoid area, which is directly behind the pinna.
4. Move the pinna up and down and manipulate the tragus.
5. Examine the ear canal using an otoscope.
   a. Select correct size speculum for the ear canal.

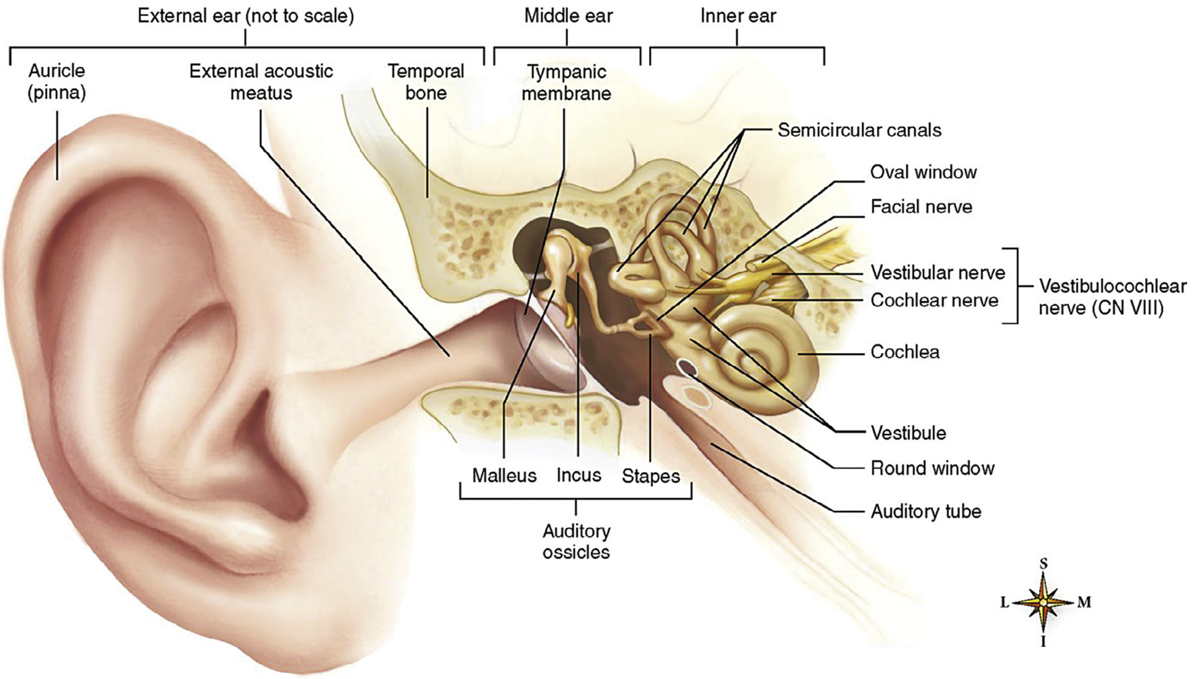
External ear (not to scale)
Middle ear
Inner ear
Auricle (pinna)
External acoustic meatus
Temporal bone
Tympanic membrane
Semicircular canals
Oval window
Facial nerve
Vestibular nerve
Cochlear nerve
Vestibulocochlear nerve (CN VIII)
Cochlea
Vestibule
Round window
Auditory tube
Malleus
Incus
Stapes
Auditory ossicles
S
L
M
I

Fig. 5.2 Structure of middle and inner ear. *CN,* Cranial nerve. (From Patton, K., & Thibodeau, G. [2013]. *Anatomy & physiology* [8th ed.]. Elsevier).

Table 5.1
Ear symptoms and the affected ear structures

Symptom	External ear	Middle ear	Inner ear
Itch	✓		
Pain	✓	✓	
Discharge	✓	✓	
Deafness	✓	✓	✓
Dizziness			✓
Tinnitus			✓

Data from Acomb, C. (1991). *Pharmaceutical Journal*.

Table 5.2
Physical findings associated with the ear and possible causes

Signs and symptoms	Possible causes
Redness and swelling of outer ear structures	Perichondritis or auricular haematoma
Discharge	Otitis externa or media
Pain in mastoid area	Otitis media or mastoiditis
Pain when pressing tragus or moving pinna	Otitis externa
Otoscope examination	**Possible causes**
Redness of the ear canal	Otitis externa
Bulging red, yellow, or cloudy tympanic membrane	Otitis media
Light reflex (cone of light)	In healthy ears: Left ear: visible at approximately 7 to 8 o'clock. Right ear: visible at approximately 4 to 5 o'clock. Absence or distortion of the light reflex is associated with otitis media

b. Straighten the ear canal. Because of its shape, the pinna needs to be manipulated to obtain the best view of the ear canal (Fig. 5.3).
c. Hold the otoscope like a pencil and brace your hand against the patient's face (to accommodate unexpected movement).
d. Insert the otoscope. Be gentle with the otoscope and ensure movements are slow to reduce discomfort.
e. Visualise the eardrum looking for discharge, redness or swelling and landmarks.
f. Remove the otoscope and dispose of the speculum in readiness for the next examination.
g. Explain to the patient that the exam is finished and thank them.

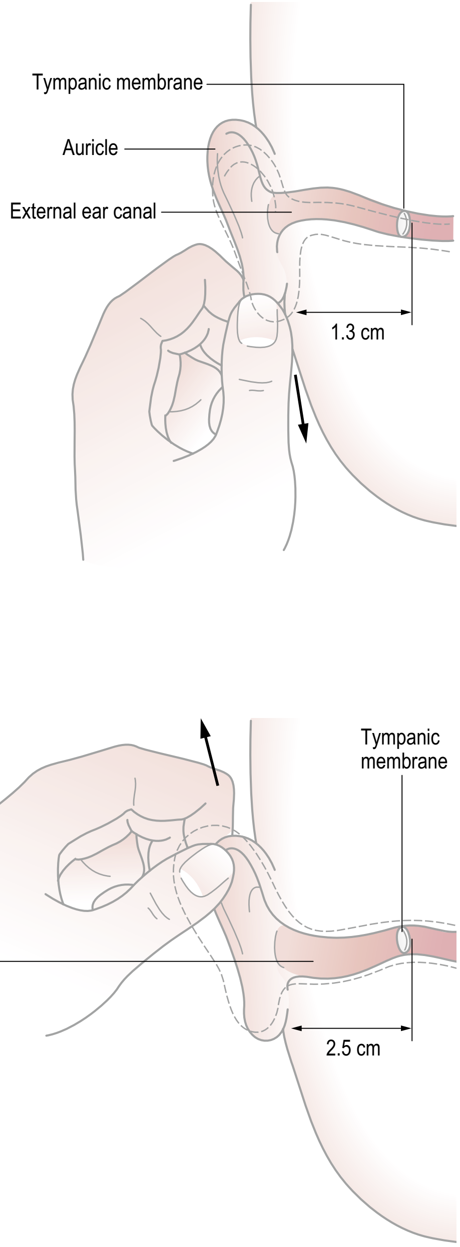

Fig. 5.3 Inspection of the ear canal. *Above,* in children; *below,* in adults.

h. Tell the patient about your findings.
i. Wash your hands.

For further information on otoscope examination and the findings, see https://www.ncbi.nlm.nih.gov/books/NBK553163.

Earwax (cerumen) impaction

Background

Earwax performs a number of important functions, including mechanical protection of the tympanic membrane, trapping dirt, repelling water and contributing to a slightly acidic medium, which has been reported to exert protection against bacterial and fungal infections. Cerumen varies in its composition among individuals but can be broadly divided into two types: a (1) wet or sticky type of wax, which is common in children and those of White and African American ethnicities or (2) dry, which is common in Asian populations.

Prevalence and epidemiology

The exact prevalence rates of earwax impaction are not clear, but studies have shown that 3% to 6% of the general population has impacted wax. Earwax removal is the most common ear, nose and throat procedure performed in primary care, with approximately 4 million ears irrigated annually in the United Kingdom. A number of patient groups appear to be more prone to earwax impaction than the general population, for example, patients with congenital anomalies (narrowed ear canal), patients with learning difficulties and those fitted with a hearing aid. Older adults are more susceptible to impaction because of a decrease in cerumen-producing glands, resulting in drier and harder earwax.

Aetiology

The skin of the tympanic membrane is unusual. It is not simply shed like skin from the rest of the body but is migratory. This is because the auditory canal is the body's only 'dead end', and abrasion of the stratum corneum cannot occur. Skin therefore moves outwards away from the eardrum. This means that the ears are largely self-cleaning because the ear canal naturally sheds wax from the ear. However, this normal function can be interrupted, usually by misguided attempts to clean ears. Wax therefore becomes trapped, hampering its outward migration.

Arriving at a differential diagnosis

Earwax impaction should be a relatively straightforward diagnosis and readily distinguished from other conditions (Table 5.3) after questioning and examination (Table 5.4).

Clinical features of earwax impaction

The key features of earwax impaction are a history of gradual hearing loss (most common symptom) and ear discomfort (to variable degrees). Itching and dizziness occur infrequently. Otoscopic examination should reveal impacted or excessive wax, especially close to the tympanic membrane.

Table 5.3
Causes of ear canal symptoms and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	Earwax
Likely	Trauma of the ear canal
Unlikely	Foreign bodies
Very unlikely	Abnormal growths Cholesteatoma Exostoses and osteomas Polyp of the ear canal

Table 5.4
Specific questions to ask the patient: Earwax

Question	Relevance
Course of symptoms	Gradual hearing loss is seen with earwax impaction.
Associated symptoms	Earwax impaction rarely causes tinnitus, vertigo or true pain.
History of ear cleaning	Check whether the person has recently tried to clean the ears. This often leads to wax impaction.

Conditions to eliminate

Likely cause

Trauma of the ear canal

It is common practice for people to use all manner of implements to try to clean the ear canal of wax (e.g., cotton buds, hairgrips, pens). Inspection of the ear canal might reveal laceration of the ear canal, and the patient may experience greater conductive deafness because of the wax becoming further impacted. Trauma might also lead to discharge from the ear canal.

Unlikely cause

Foreign body

Symptoms can mimic earwax impaction, but over time, discharge and pain are observed. Children are the most likely age group to present with a foreign body in the ear canal (e.g., toys, food), although it can also affect adults (insects). Otoscopic examination should reveal the object.

Very unlikely causes

Abnormal growths

All are rare causes of hearing loss, and visualisation of the ear canal should reveal a degree of occlusion to the ear drum.

Cholesteatoma

Cholesteatoma is a destructive and expanding growth in the middle ear or mastoid process. It is characterised by persistent or recurrent malodorous purulent discharge and fullness. Conductive hearing loss is present in 90 % of patients.

Exostoses and osteomas

Patients may experience a sense of ear fullness, tinnitus or otorrhoea. Exostoses are multiple and bilateral and are found adjacent to the tympanic membrane. Patients with exostoses often report a history of cold-water swimming. Osteomas are single and unilateral and are found at the bony–cartilaginous junction and are generally asymptomatic and only discovered on examination.

Polyp of the ear canal

Most patients experience gradual hearing loss and a persistent or recurring watery, often smelly, discharge from the ear. Some people may experience slight discomfort in their ear.

Red flags indicative of referral: Earwax

Reason for referral	Why referring	Timeframe for referral
Over-the-counter (OTC) medication failure	Further investigation needed and possibly ear irrigation	As soon as practicable
Foreign body in the ear canal	Requires removal	
Impaired hearing in children not associated with earwax	Suggests development of glue ear (see earache section)	
Gradual hearing loss associated with otorrhoea	Suggests polyps or other growths	

Evidence base for over-the-counter medication

Cerumenolytics have been used for many years to help soften, dislodge and remove impacted earwax. A Cochrane review (Aaron et al., 2018) identified 10 studies with a total of 623 participants (900 ears) that examined oil- and water-based treatments and other active comparators (e.g., saline, water). They compared these treatments with each other and with no treatment. The authors found only one study that showed a significant increase in the proportion of patients with complete clearance of earwax (22%) compared with placebo (5%). However, comparisons of active treatments with water or saline or with each other failed to demonstrate any significant differences. The authors concluded that although active treatment may result in a greater likelihood of complete clearance compared with no treatment at all, there is no evidence that one active treatment is better than another, nor is there any evidence that commercially produced treatments are better than saline or water alone.

Summary

The evidence from limited trial data suggests simple remedies, such as water, appear to be equally as effective as marketed earwax products.

Practical prescribing and product selection

Prescribing information relating to earwax medicines reviewed in the section 'Evidence base for over-the-counter medication' is discussed and summarised in Table 5.5, and useful tips relating to patients presenting with earwax are given in 'Hints and tips' in Box 5.1.

Table 5.5
Practical prescribing: Summary of medicines for earwax

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Sodium bicarbonate	Older than 1 year	None	None	None	OK
Oil-based products					
Peroxide-based products		Irritation			
Docusate					

HINTS AND TIPS BOX 5.1: EARWAX

Peanut allergy	Peanut allergy affects approximately 1 in 200 people, and patients should be warned about preparations that contain *Arachis* or almond oil.
Administration of ear drops	1. Hold the bottle in your hands for a few minutes before administration to warm the solution. This makes insertion more comfortable. 2. Have the patient lie on a bed with the affected ear pointing towards the ceiling or tilt the head to one side, with the affected ear pointing towards the ceiling. 3. With one hand, straighten the patient's ear canal. Adults pull the pinna up and back, and children pull the pinna down and back. 4. Holding the dropper in the other hand, hold it as near as possible to the patient's ear canal without touching it and place the correct number of drops into the ear canal. 5. The patient's head should be kept in the same position for several minutes. 6. After the patient's head is returned to the normal position, any excess solution should be wiped away with a clean tissue.

Cerumenolytics

Agents used to soften earwax are very safe. They can be given to all patient groups, do not interact with any medicines and can be used in children. They have very few side effects, which if experienced, appear to be limited to local irritation when first administered. They might, for a short while, increase deafness, and the patient should be warned about this possibility.

Oil-based products

Arachis: peanut oil (Cerumol ear drops)
The standard dose for adults and children is five drops into the affected ear twice a day, repeated for up to 3 days. In between administration, a plug of cotton wool, moistened with Cerumol or smeared with petroleum jelly, should then be applied to retain the liquid.

Olive oil drops (e.g., Cerumol Extra Virgin Olive Oil Drops, Earex olive Oil drops, Otex olive oil drops)

For adults and children, two to three drops should be instilled twice a day for up to 7 days. Like Cerumol, a cotton wool plug should be gently placed in the ear to retain the liquid.

Peroxide-based products (e.g., Earex Advance & Otex)

For adults and children, between 3 to 6 drops (Earex) or 5 drops (Otex) should be instilled once or twice daily for at least 3 to 4 days. Patients might experience mild temporary effervescence in the ear as the urea–hydrogen peroxide complex liberates oxygen.

Water-based products (e.g., sodium bicarbonate)

For adults and children, three to four drops should be instilled two to three times a day for up to 3 days.

Docusate (Waxsol)

The dosage for adults and children is to use at night by placing enough ear drops to sufficiently fill the affected ear; then place a small plug of cotton wool in the ear and repeat for 2 consecutive nights if needed.

Reference

Aaron, K., Cooper, T. E., Warner, L., & Burton, M. J. (2018). Ear drops for the removal of earwax. *Cochrane Database System Review, 7*, CD012171.

Website

Cerumen Impaction: https://bestpractice.bmj.com/topics/en-gb/1032

Otitis externa

Background

Otitis externa refers to generalised inflammation throughout the ear canal, which may also involve the pinna. It usually occurs as an acute episode (<6 weeks) but may become chronic (>3 months).

Prevalence and epidemiology

The lifetime prevalence of acute otitis externa is 10%, and a family doctor sees approximately 16 new cases per year. It occurs in all age groups, but those with skin conditions (e.g., seborrhoeic dermatitis, psoriasis) and exposed to water (e.g., swimmers) are more predisposed.

Aetiology

Bacterial infection (90% of cases), contact sensitivity or a combination of both causes otitis externa. Changes to microflora result from excessive moisture, leading to skin maceration and skin cerumen breakdown that changes the microflora of the ear canal. Pathogens implicated with acute otitis externa include *Pseudomonas aeruginosa, Staphylococcus* spp. and *Streptococcus pyogenes.* Fungal overgrowth with *Aspergillus* spp. is also seen, especially after prolonged antibiotic treatment.

Arriving at a differential diagnosis

In common with earwax impaction, otitis externa is easily recognised, provided that a careful history and ear examination has been conducted. However, other otologic conditions can present with similar symptoms (Table 5.6). Table 5.7 highlights some of the questions that should be asked to help establish a differential diagnosis.

Clinical features of otitis externa

Otitis externa is characterised by itching and irritation, which, depending on the severity, can become intense. This provokes the patient to scratch the skin of the ear canal, resulting in trauma and

Table 5.6
Causes of outer ear and ear canal symptoms and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Otitis externa
Likely	• Chronic suppurative otitis media • Foreign body • Otitis media
Unlikely	• Dermatitis (contact, allergic, seborrhoeic or atopic)
Very unlikely	• Cholesteatoma • Malignancy • Perichondritis

Table 5.7
Specific questions to ask the patient: Otitis externa

Question	Relevance
Symptom presentation	Principal symptoms of acute otitis externa are itch, irritation and pain.
Discharge	Otitis media is the most common cause of ear discharge and is usually mucopurulent. If discharge is present with otitis externa, discharge would not be mucopurulent. Offensive discharge suggests foreign body or cholesteatoma. Discharge of long duration in children suggests chronic suppurative otitis media.
Systemic symptoms	Otitis externa and dermatitis should not present with any systemic symptoms. Fever and cold symptoms are often present in otitis media. Fever is seen in mastoiditis.

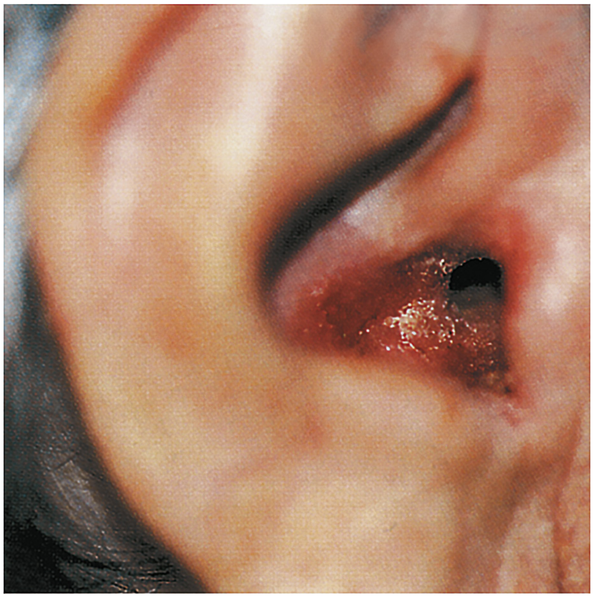

Fig. 5.4 Otitis externa. (From Milford, C., & Rowlands, A. [1999]. *Shared care for ENT*. Isis Medical Media; Martin Dunitz Publishers, with permission of Taylor & Francis Books UK).

pain. Patients might not present until pain becomes a prominent feature. However, there should be a period when irritation is the only symptom apparent. Chewing and manipulation of the tragus and pinna can exacerbate pain. Otorrhoea can follow, and the skin of the ear canal can become oedematous. Hearing loss is possible but is uncommon. On examination, the ear canal, external ear or both appears red, swollen or eczematous (Fig. 5.4). Symptoms should resolve within 10 days.

Conditions to eliminate

Likely causes

Acute otitis media

In young children, it is often manifested as irritability or crying, with characteristic ear tugging or rubbing. Systemic symptoms, such as fever and loss of appetite, can also be present. In older children, ear pain or earache is the predominant feature and tends to be throbbing. For more information on otitis media and other conditions that present similarly, see the section on earache.

Chronic suppurative otitis media

This is characterised by hearing loss in the affected ear and discharge (through perforation in the tympanic membrane) lasting more than 2 weeks that is not associated with pain or fever.

Unlikely causes

Dermatitis

Allergic, contact, seborrhoeic and atopic forms of dermatitis can occur on the external ear and could be mistaken for otitis externa. Itch is a prominent symptom, but no ear pain or discharge is associated with dermatitis. In addition, in the seborrhoeic and atopic forms, skin involvement elsewhere should be present.

Foreign body in the ear canal

Purulent discharge, pain and conductive hearing loss are observed. Children are the most likely age group to present with a foreign body in the ear canal (e.g., toys, food), although it can affect adults (insects). Otoscopic examination should reveal the object.

Very unlikely causes

Cholesteatoma

Causes persistent or recurrent ear discharge and fullness but is typically painless. Conductive hearing loss is present in 90% of patients.

Malignant tumours

Basal and squamous cell carcinomas are typically slow growing and are associated with increasing age. Any older patient presenting with an ulcerative or crusting lesion needs referral.

Perichondritis

In severe cases of otitis externa, inflammation can spread from the outer ear canal to the pinna, resulting in perichondritis (Fig. 5.5). Referral is needed because systemic antibiotics are required.

Trauma

Recent trauma (e.g., blow to the head) can cause auricular haematoma. This is best known as a cauliflower ear and requires nonurgent referral.

Red flags indicative of referral: Otitis externa

Reason for referral	Why referring	Timeframe for referral
Generalised redness or swelling of the pinna	Suggests perichondritis or trauma	Same-day referral
Slow-growing growths on the pinna or in the ear canal	Suggests malignancy or cholesteatoma	As soon as practicable

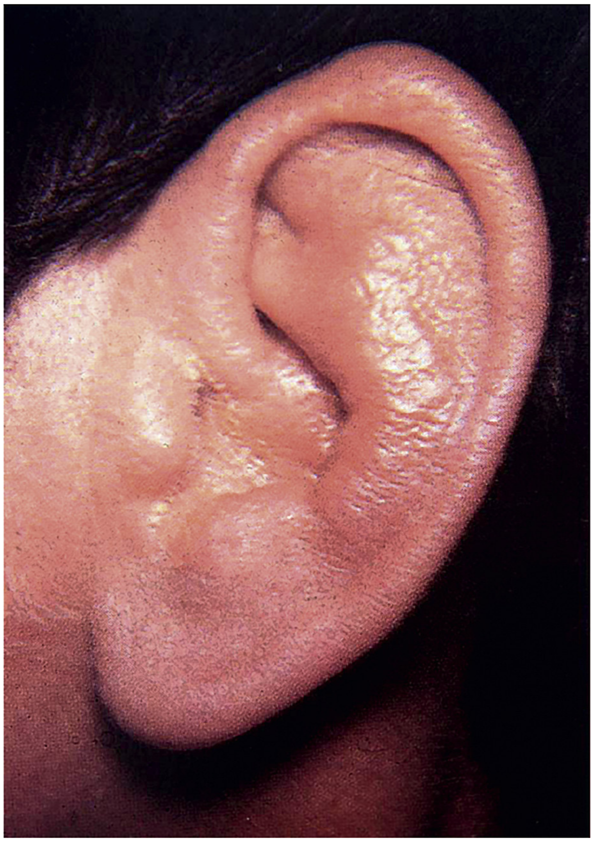

Fig. 5.5 Perichondritis. (Courtesy of Dr Joydeep Som. From Belleza, W. G., & Kalman, S. [2006]. Emergencies in the outpatient setting: Part 1. *Medical Clinics of North America, 90*(2), 329–353, Elsevier, with permission.)

Evidence base for over-the-counter medication

OTC treatment of otitis externa is currently limited to acetic acid (EarCalm Spray, 2% acetic acid) and is indicated for the treatment of superficial infections of the ear canal. A Cochrane review (Kaushik et al., 2010) concluded that acetic acid was as effective as antibiotics and steroids for up to a 1-week treatment, and current (summer 2024) UK guidelines advocate its use for mild cases. Nonmedical prescribers may consider prescribing drops containing an antibiotic with or without a corticosteroid.

Practical prescribing and product selection

Patients should be told to try to keep their ears dry. For example, avoid swimming when possible and keep water out of the ears when showering. Prescribing information relating to acetic acid is discussed next and summarised in Table 5.8.

Acetic acid (Earcalm Spray)

This can be given to adults and children older than 12 years. The dosage is one spray (60 mg) into the affected ear at least three times a day. The maximum dosage frequency is one spray every 2 to 3 hours. Treatment should be continued until 2 days after symptoms have disappeared, but if symptoms do not improve or worsen within 48 hours, the patient should be referred. The spray should not be used for more than 7 days.

Reference

Kaushik, V., Malik, T., & Saeed, S. R. (2010). Interventions for acute otitis externa. *Cochrane Database System Review, 1*, CD004740.

Further reading

Wiegand, S., Berner, R., Schneider, A., Lundershausen, E., & Dietz, A. (2019). Otitis externa. *Deutsches Arzteblatt International, 116*, 224–234. https://doi.org/10.3238/arztebl.2019.0224.

Table 5.8
Practical prescribing: Summary of medicines for otitis externa

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Acetic acid	Older than 12 years	Transient stinging or burning sensation	None	None	OK

Earache

Background

Ear pain (otalgia) is classed as either primary (originating from the external, middle, or inner ear) or secondary (originates outside the ear [i.e., referred]). Ear pain is a common symptom.

Prevalence and epidemiology

In children, primary otalgia is most common, typically otitis media or otitis externa. Otitis media is most prevalent in young children, especially in children younger than 4 years of age, and is more common in winter.

Aetiology

Infection of the middle ear can be viral, bacterial or coinfection. The most common viral pathogens include the respiratory syncytial virus and coronaviruses; bacterial causes are *Streptococcus pneumoniae*, *Haemophilus influenzae* and *Moraxella catarrhalis*. The invading pathogens from the nasopharynx trigger an inflammatory cascade that produces oedema that obstructs the Eustachian tube, leading to an increase in negative pressure in the middle ear and an accumulation of oedema in the middle ear. This environment encourages pathogen growth, which causes further suppuration and symptoms of otitis media.

Arriving at a differential diagnosis

Table 5.9 highlights those conditions that may be encountered by community pharmacists and their relative incidence. Asking symptom-specific questions helps to establish a differential diagnosis (Table 5.10).

Clinical features of earache

Otitis media (acute)

Symptoms develop rapidly. Young children often hold or rub their ears or have nonspecific symptoms such as fever, crying, poor feeding and restlessness. In older children, ear pain or earache is the predominant feature and tends to be throbbing. An examination of the ear should reveal a red-yellow and bulging tympanic membrane with a loss of normal landmarks (Fig. 5.6).

Table 5.9
Causes of earache and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Otitis media (acute)
Likely	• Otitis externa
Unlikely	• Dental infection or abscess • Eustachian tube dysfunction or barotrauma • Foreign body • Temporomandibular joint disorders
Very unlikely	• Mastoiditis

Table 5.10
Specific questions to ask the patient: Earache

Question	Relevance
Unilateral or bilateral	• Unilateral: suggests otitis externa or foreign body • Unilateral or bilateral: suggests otitis media or barotrauma
Presence of risk factors	• History of swimming or wearing hearing aids suggests otitis externa. • Air travel or diving suggests barotrauma. • Trauma or stress suggests temporomandibular joint dysfunction.
Symptom presentation	• Itch or irritation followed by discharge or pain suggests otitis externa. • Systemically unwell is seen in mastoiditis. • Ear pain as the main symptom suggests barotrauma or otitis media (older children).
Presence of symptoms before ear pain	• URTI suggests otitis media.

URTI, Upper respiratory tract infection.

Conditions to eliminate

Likely cause

Otitis externa

Patients experience itching of the ear canal, ear pain and tenderness on manipulation of the pinna or tragus, and their ear canals are oedematous and can be filled with infectious debris. Ear discharge is often seen. Conductive hearing loss may occur if swelling and debris occlude the canal.

Unlikely causes

Dental infection or abscess

The main symptom is sudden onset pain in the affected tooth, which can be intense and throbbing. Other symptoms include tooth sensitivity to heat and cold, unpleasant taste in the mouth, fever and malaise. The pain can radiate to the ear.

Eustachian tube dysfunction or barotrauma

Ear barotrauma is discomfort in the ear caused by pressure differences between the inside and outside of the eardrum. It is usually observed with altitude changes, such as flying, although it can be experienced with upper respiratory tract infections. Ear discomfort or pain and a

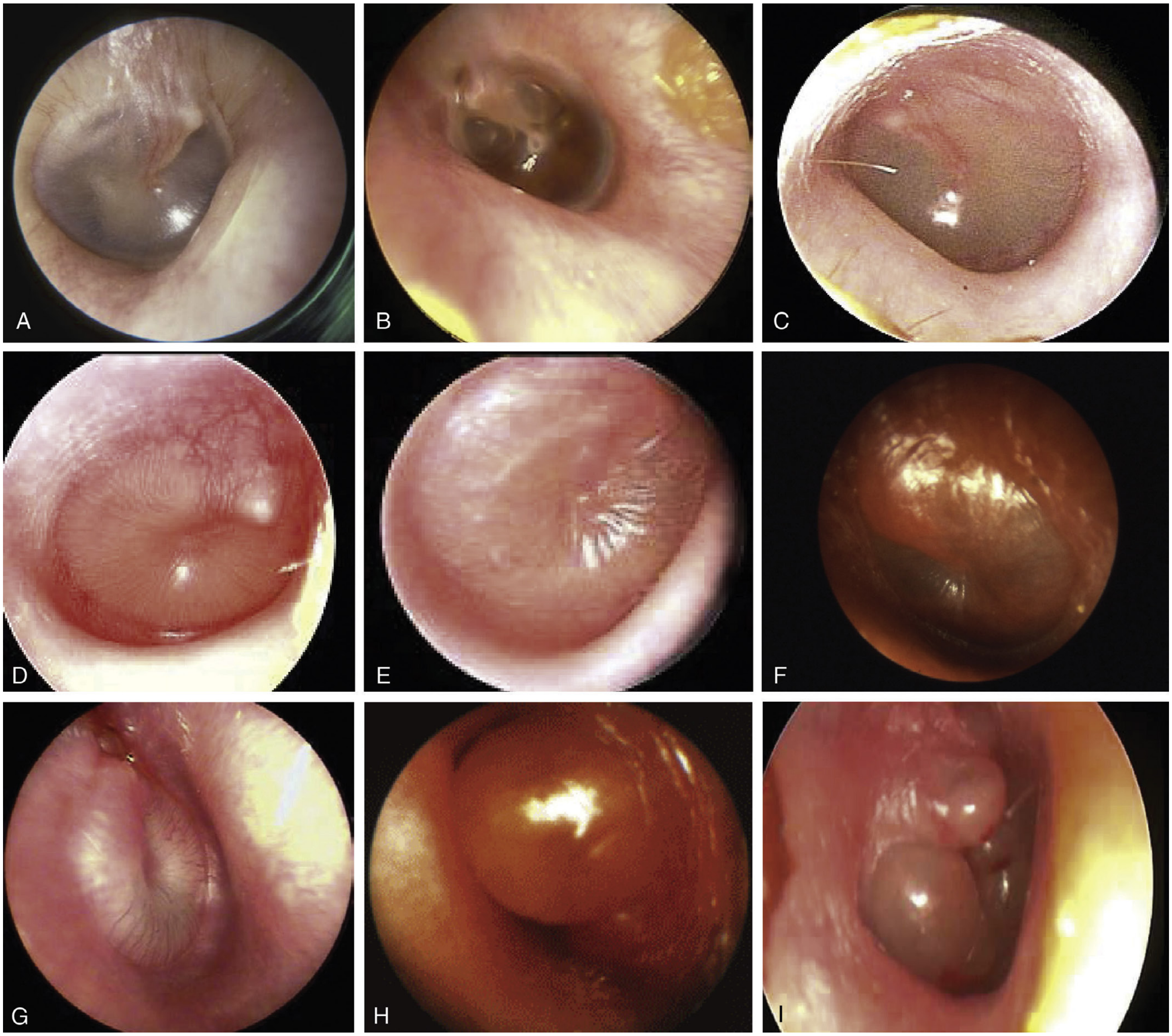

Fig. 5.6 Otitis media. (A) Normal tympanic membrane with pearly gray, translucent appearance. (B) OME with air bubbles. (C and D) OME fully filled with effusion; note retracted and translucent tympanic membrane with prominent head of the malleus. (E) Slight bulging with semiopaque white tympanic membrane. (F) Bulging semiopaque tympanic membrane. (G) Markedly bulging, donut appearance, opaque, white tympanic membrane. (H and I) Severe bulging with bullae formation. (From Courtesy Dr. Hoberman, University of Pittsburgh. In Cherry, J. D., et al. [2019]. *Feigin and Cherry's pediatric infectious diseases* [8th ed.]. Philadelphia, Elsevier).

sensation of ear fullness (often described as being underwater) are the commonest symptoms. Other symptoms that may be experienced are tinnitus, dizziness and popping or clicking noises.

Foreign body

This most often occurs in toddlers. A foreign object in the ear can cause pain and hearing loss and over time, it can cause infection in which redness, swelling and discharge may be present.

Temporomandibular joint disorders

Temporomandibular disorder (TMD) is most common among people between the ages of 20 and 40 years. Symptoms include pain or tenderness in the face, jaw joint area, neck and shoulders and in or around the ear. Pain worsens on chewing, speaking or opening the mouth. Clicking or grating sounds in the jaw joint can be heard when the mouth is open and closed open. Patients with TMD also report headaches and otologic symptoms, such as otalgia, tinnitus, vertigo, ear fullness and hearing loss.

Very unlikely cause

Mastoiditis

The person generally presents as systemically unwell with fever. Ear pain, mastoid tenderness and swelling are seen. A history of a recent episode of acute otitis media is common.

Red flags indicative of referral: Earache

Reason for referral	Why referring	Timeframe for referral
Systemically very unwell	Possible need for antibiotics	Same day
Mastoid tenderness	Suggests mastoiditis	
Jaw pain	Suggests temporomandibular joint disorder	As soon as practicable
Referred ear pain from the face	Suggests temporomandibular joint disorder or dental infection	

Evidence base for over-the-counter medication and practical Prescribing and product selection

Current UK guidelines do not advocate the routine use of antibiotics unless they are systemically unwell. These patients should be considered for antibiotics (5- to-7-day course of amoxicillin). If antibiotics are not justified then symptoms should be managed with analgesia (paracetamol or ibuprofen).

Further reading

Earwood, J. S., Rogers, T. S., & Rathjen, N. A. (2018). Ear pain: Diagnosing common and uncommon causes. *American Family Physician, 97*, 20–27.

Hwa, T. P., & Brant, J. A. (2021). Evaluation and management of otalgia. *The Medical Clinics of North America, 105*, 813–826.

Website

Otitis media (acute): Antimicrobial prescribing NG91. https://www.nice.org.uk/guidance/ng91

Hearing loss

Background

Hearing loss is a global problem, with the World Health Organization estimating that 1 in 4 people will have some level of hearing loss by 2050. Disabling hearing loss refers to hearing loss greater than 35 dB in the better-hearing ear. Nearly 80% of people with disabling hearing loss live in low- and middle-income countries. The consequences of undetected hearing loss can result in poor educational attainment in children and social isolation in adults and is associated with developing anxiety and depression.

Prevalence and epidemiology

In the UK, it is estimated 11 million people have hearing loss, with almost 1 million having disabling loss. It can be temporary or permanent and is increasingly common with advancing age.

Aetiology

The process of hearing starts with sound collection via the pinna directing sound waves down the ear canal. Sound waves then strike the tympanic membrane, causing it to vibrate, which in turn causes the membrane of the oval window to vibrate. These vibrations cause the perilymph in the bony labyrinth of the cochlea and the endolymph in the membranous labyrinth of the cochlea or the cochlea duct to move. This movement causes the basilar membrane to vibrate and in turn stimulates hair cells on the organ of Corti to transmit nerve impulses along the cranial nerve to the auditory cortex and are then interpreted as sound.

Hearing loss can be categorised as conductive, sensorineural or both. Conductive hearing loss occurs when sound conduction is impeded through the external ear, the middle ear or both. Sensorineural hearing loss occurs when there is a problem within the cochlea or the neural pathway to the auditory cortex.

Arriving at a differential diagnosis

Although age-related hearing loss is most often encountered, the differing pathological processes causing hearing loss mean many conditions need to be considered.

Table 5.11 highlights those conditions that may be encountered by community pharmacists and their relative incidence. Asking symptom-specific questions helps to establish a differential diagnosis (Table 5.12).

Table 5.11
Causes of hearing loss and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	Age-related hearing loss (presbycusis)
Likely	Chronic suppurative otitis media Impacted earwax Noise exposure Otitis externa Otitis media Otitis media with effusion Tympanic membrane perforation (trauma)
Unlikely	Foreign bodies Head trauma Infections Medication Ménière disease Otosclerosis
Very unlikely	Exostoses and osteomas Perilymphatic fistula Tumours o Acoustic neuroma o Cholesteatoma o Glomus tumours

Table 5.12
Specific questions to ask the patient: Hearing loss

Question	Relevance
Unilateral or bilateral	- Most aural growths, perilymphatic fistula and foreign bodies show unilateral presentations.
Sudden vs progressive	- Infectious causes tend to more acute and sudden in onset. - Age-related hearing loss and aural growths tend to show gradual hearing loss.
When did your hearing loss begin?	- This may be attributed to one off events (e.g., music concerts, trauma, occupational exposure).
Have you been having ringing in the ears or dizziness?	- Symptoms of tinnitus or dizziness are associated with conditions such as exostoses, tumours, trauma, Ménière disease or perilymphatic fistula.
Are there particular frequencies at which hearing loss occurs?	- Age-related hearing loss sees a loss of high-pitched sounds. - In contrast conditions such as otosclerosis, there is a loss of low-pitched sounds.

Clinical features of age-related hearing loss (presbycusis)

Hearing loss is progressive and occurs in older patients. High-frequency hearing and speech discrimination ability are most affected. Because this type of loss occurs over time, people may not easily notice deterioration. Family and friends may therefore notice hearing loss; for example, the person may have the TV or radio on loud; be unable to follow conversations in social settings, asking you to repeat what you have said; or struggle to hear what you say on the phone.

Conditions to eliminate

Likely causes

Chronic suppurative otitis media

This is characterised with hearing loss in the affected ear and discharge (through perforation in the tympanic membrane) lasting more than 2 weeks that is not associated with pain or fever.

Impacted earwax

The key features of earwax impaction are a history of gradual hearing loss (the most common symptom), and variable degrees of ear discomfort. Itching, tinnitus and dizziness occur very infrequently.

Noise exposure

Occupational, recreational or accidental exposure to sounds greater than 85 dB can produce hearing loss accompanied by tinnitus. It occurs more commonly in people working in environments with chronic exposure to loud noises and insufficient ear protection or from a one-off loud noise, such as an explosion or gunfire. Patients typically report that the symptoms are worse in noisy and crowded environments.

Otitis externa

Conductive hearing loss may occur if swelling and debris occlude the canal. It is characterised by itching and irritation, which depending on the severity, can become intense. Chewing and manipulation of the tragus and pinna can exacerbate pain.

Otitis media

A complication of acute otitis media is conductive hearing loss. See the earlier section on earache otitis for further information.

Otitis media with effusion (glue ear)

Young children may develop persistent otitis media after bouts of acute otitis media. Hearing loss is the usual presenting symptom in glue ear. Mild pain may also be noted; otherwise, it is symptomless. Otoscope examination shows a normal tympanic membrane, but it can often be retracted.

Tympanic membrane perforation

The main causes of tympanic membrane perforations are chronic otitis media and trauma. Traumatic perforations of the tympanic membrane can occur because of water accidents, barotrauma, explosions, penetrating injury or temporal bone fractures.

Unlikely causes

Foreign bodies

Foreign bodies in the external auditory canal can cause unilateral conductive hearing loss, but discharge is generally a more prominent feature. Children are the most likely age group to present with a foreign body in the ear canal (e.g., toys, food), although it can also affect adults (e.g., insects).

Head trauma

Damage to the inner ear can be caused by a blow to the head. Concussions are linked to hearing loss and tinnitus.

Infections

Complications of certain viral infections, such as measles, meningitis and mumps, can cause sensorineural hearing loss.

Medications

Ototoxicity specifically affects the cochlea or auditory nerve and sometimes the vestibular system. Medicines that can cause hearing loss include aminoglycoside antibiotics (e.g., gentamicin), loop diuretics (e.g., bumetanide and furosemide), nonsteroidal antiinflammatory drugs, aspirin, antimalarials (e.g., quinine and chloroquine) and cytotoxic drugs (e.g., cisplatin and bleomycin). Symptoms are bilateral, and the effect can either be reversible and temporary or irreversible and permanent.

Ménière disease

This can occur at any age but is more common in people between 40 and 60 years of age. It can cause severe dizziness (vertigo), unilateral fluctuating hearing loss with a feeling of pressure in the ear and tinnitus. Initially, hearing loss is in the low frequencies, but higher frequencies are affected as the disease progresses. Some people with Ménière disease have vertigo so extreme that they lose their balance and fall.

Otosclerosis

Otosclerosis refers to abnormal bone growth affecting the small bones of the ear. It typically starts in one ear and then moves to the other. Hearing loss occurs gradually. Many people with otosclerosis first notice that they are unable to hear low-pitched sounds or cannot hear a whisper. Some people may also experience dizziness, tinnitus and balance problems. It typically affects middle-aged White females. There is usually a positive family history.

Very unlikely causes

Exostoses and osteomas

These are rare benign bony growths of the external auditory canal that lead to occlusion and conductive hearing loss. Patients may also experience a sense of ear fullness, tinnitus or otorrhoea. Exostoses are multiple and bilateral and are found adjacent to the tympanic membrane. Patients with exostoses often report a history of cold-water swimming. Osteomas are single and unilateral and are found at the bony–cartilaginous junction and are generally asymptomatic and only discovered on examination.

Perilymphatic fistula

This is a rare condition. It causes acute onset unilateral sudden hearing loss, tinnitus, vertigo and unsteadiness. There is usually a history of barotrauma, head or ear trauma.

Tumours

Acoustic neuroma is a benign tumour which can cause hearing loss, vertigo and unsteadiness by compressing the cochlear nerve. Symptoms tend to develop gradually, usually affecting one ear. They occur most frequently in adults aged 30 to 60 years old.

Cholesteatoma is a destructive and expanding growth in the middle ear, mastoid process or both. They are characterised by persistent or recurrent malodorous purulent discharge and fullness. Conductive hearing loss is present in 90% of patients.

Glomus tumours are rare causes of conductive hearing loss. Characteristically, patients are females 40 to 50 years of age who report pulsatile tinnitus and hearing loss.

Red flags indicative of referral: Hearing loss

Reason for referral	Why referring	Timeframe for referral
- Sudden onset hearing loss - Hearing loss which rapidly progresses	- Suggests sinister pathology	- Same day
- Gradual hearing loss not associated with outer or middle ear pathology or foreign body	- Suggests pathology unrelated to infection	- As soon as practicable
- Persistent hearing loss in children	- Suggests chronic suppurative otitis media or glue ear	

Practical prescribing and product selection

If hearing loss is attributed to conditions such as earwax impaction or local infection, then these should be treated as such. If hearing loss is suspected to be from other causes, then these require audiological assessment.

Further reading

Michels, T. C., Duffy, M. T., & Rogers, D. J. (2019). Hearing loss in adults: Differential diagnosis and treatment. *American Family Physician, 100*, 98–108.

Rizk, H. G., Lee, J. A., Liu, Y. F., Endriukaitis, L., Isaac, J. L., & Bullington, W. M. (2020). Drug- induced ototoxicity: A comprehensive review and reference guide. *Pharmacotherapy, 40*, 1265–1275.

Zahnert, T. (2011). The differential diagnosis of hearing loss. *Deutsches Ärzteblatt International, 108*, 433–443; quiz 444.

Websites

RNID. https://rnid.org.uk
Tinnitus UK. http://www.tinnitus.org.uk

Dizziness and vertigo

Background

The term *dizziness* describes sensations of feeling faint, unsteady or off-balance or woozy. When dizziness creates a false sense that one's surroundings are spinning or moving, then it is defined as vertigo.

Prevalence and epidemiology

Dizziness (including vertigo) affects about 15% to 20% of adults. Vestibular vertigo accounts for about 25% of dizziness complaints. Its prevalence increases with age and is about two to three times higher in females than in males. Studies have documented benign paroxysmal positional vertigo (BPPV) as the commonest cause, with vestibular neuronitis the second most common cause of vertigo. Ménière disease is about 10 times less frequent than BPPV. Nonvestibular causes are uncommon.

Aetiology

Dizziness and vertigo can be caused by diverse aetiologies, including vestibular, cardiovascular, neurologic and psychogenic causes. Vestibular causes (e.g., peripheral causes) tend to be associated with detachment of otoliths from the utricle, which then float around in the semicircular canals, settling in the posterior semicircular canal. These are subject to movement when a person's head position changes, causing dizziness or vertigo symptoms. Other aetiologias have a 'central' cause and affect brain pathology.

Arriving at a differential diagnosis

Dizziness or vertigo can be the predominant symptom (e.g., BPPV) or may be part of a symptom cluster but not the presenting symptom (e.g., acute otitis externa or anxiety). Table 5.13 highlights those conditions that may be encountered by community pharmacists and their relative incidence. Asking symptom-specific questions helps to establish a differential diagnosis (Table 5.14).

Table 5.13
Causes of dizziness or vertigo and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• BPPV
Likely	• Labyrinthitis • Ménière disease • Postural (orthostatic) hypotension • Vestibular neuronitis
Unlikely	• Cardiovascular causes • Diabetes (hypoglycaemia) • Migraine • PPPD • Otosclerosis
Very unlikely	• Acoustic neuroma • Cholesteatoma • Carbon monoxide poisoning • Multiple sclerosis • Perilymphatic fistula • Superior semicircular canal dehiscence • Vertebrobasilar insufficiency

BPPV, Benign positional paroxysmal vertigo; *PPPD,* persistent postural-perceptual dizziness.

Table 5.14
Specific questions to ask the patient: Dizziness or vertigo

Question	Relevance
Severity of vertigo	• Mild to moderate: BPPV • Severe: Ménière disease and vestibular neuronitis
Dizziness present	• Prominent in labyrinthitis, postural hypotension, cardiovascular causes, PPPD, carbon monoxide poisoning and diabetes
Nausea present	• Prominent in BPPV, Ménière disease, vestibular neuronitis and vestibular migraine
Vision affected	• Seen in vertebrobasilar insufficiency and multiple sclerosis
Hearing loss	• Seen in aural tumour and otosclerosis • Not seen in vestibular neuronitis

BPPV, Benign positional paroxysmal vertigo; *PPPD,* persistent postural-perceptual dizziness.

Physical examination (e.g., cranial nerve testing) and tests (e.g., Dix-Hallpike manoeuvre) can give useful information on the origin of vertigo but are probably currently outside the competency of most pharmacists.

Clinical features of benign positional paroxysmal vertigo

This tends to occur in people older than 50 years of age and is more common in females. Episodic vertigo and nausea are experienced when the head is in certain positions (e.g., lying on one side or face up in bed). Episodes tend to short-lived (typically <1 minute), but people can feel off balance for several hours after symptoms have gone.

Conditions to eliminate

Likely causes

Labyrinthitis

Labyrinthitis is an inner ear infection. The most common symptoms are dizziness, hearing loss and vertigo. These symptoms can range from mild to severe. Other symptoms may include tinnitus, nausea, aural fullness (pressure in the ear), ear pain and visual disturbances.

Ménière disease

Ménière disease causes vertigo and unilateral hearing loss. It is more common among people between 20 and 60 years of age. Vertigo associated with Ménière disease is often severe enough to necessitate bed rest and can cause nausea, vomiting and loss of balance. It can occur suddenly, is not provoked by changes in position and lasts much longer than BPPV, anywhere from 30 minutes to several hours. Other symptoms include sudden slips or falls, tinnitus and headache.

Postural (orthostatic) hypotension

Postural hypotension is a symptom rather than a condition but is associated with Parkinson disease, certain medication and increasing age, especially those older than 60 years of age. An abnormal decrease in blood pressure when changing from lying or sitting to a standing position gives rise to lightheadedness or dizziness and can lead to falls. Classic postural hypotension occurs within 3 minutes of standing, although delayed symptoms beyond 3 minutes are sometimes seen. It can be experienced at any time of the day. Many medicines are implicated, including antihypertensives and nitrates, although polypharmacy (taking more than five medicines) is probably more of a contributory factor to causes of hypotension and dizziness.

Vestibular neuronitis

It most commonly affects people 30 to 50 years of age. Symptoms are acute in onset and generally severe, although they tend to subside over a few days. Nausea and vomiting are common, but auditory symptoms (e.g., hearing loss) are not present. Balance can be affected. A prior viral illness is often experienced. Nystagmus (rhythmical, repetitive and involuntary movement of the eyes) is present.

Unlikely causes

Cardiovascular causes

Dizziness, lightheadedness or syncope can be experienced by people who have underlying cardiovascular problems (e.g., arrhythmia, aortic stenosis, sick sinus syndrome). However, common to cardiac pathology, patients should exhibit other symptoms, including an irregular pulse, palpitations, chest discomfort, shortness of breath and fatigue. These may be exacerbated by activity.

Diabetes (hypoglycaemia)

Low blood sugar is a common problem primarily associated with diabetes. Various signs and symptoms can be experienced with dizziness and lightheadedness being common. Others include sweating, feeling tired and hungry, shakiness, difficulty concentrating, tingling lips and irregular or fast heartbeat.

Migraine

Episodic vertigo and dizziness in a patient with a history of migraine headaches suggests vestibular migraine. Patients experience 'typical' migraine symptoms such as intense headache, nausea or vomiting.

Persistent postural-perceptual dizziness

Persistent postural-perceptual dizziness (PPPD) is characterised by persistent sensations of rocking or swaying unsteadiness or dizziness without vertigo lasting 3 months or more. Most patients have daily symptoms, although the severity fluctuates. Symptoms are related to body posture and are more severe when walking or standing compared with sitting or lying down. A previous vestibular disorder is often a triggering event for PPPD.

Otosclerosis

The most frequently reported symptom of otosclerosis is gradual hearing loss, which usually starts in one ear and then moves to the other. Many people with otosclerosis first notice that they are unable to hear low-pitched sounds or cannot hear a whisper. Some people may also experience dizziness, balance problems and tinnitus. It typically affects middle-aged White females. There is usually a positive family history.

Very unlikely causes

Acoustic neuroma

Acoustic neuroma is a benign tumour which can cause hearing loss, vertigo and unsteadiness by compressing the cochlear nerve. Tinnitus may also be present. Symptoms tend to develop gradually, usually affecting one ear. They occur most frequently in adults aged 30 to 60 years.

Cholesteatoma

They are characterised by persistent or recurrent malodorous purulent discharge and fullness. Conductive hearing loss is present in 90% of patients. Dizziness and vertigo are possible but are uncommon.

Carbon monoxide poisoning

Dizziness is a common symptom of carbon monoxide poisoning along with headache, weakness, vomiting, chest pain, shortness of breath and confusion.

Multiple sclerosis

Multiple sclerosis presents with wide ranging neurologic signs and symptoms and includes vertigo. The most common initial presentation includes unilateral visual loss, muscle weakness and paraesthesia. Onset is usually before the age of 50 years.

Perilymphatic fistula

This causes acute onset unilateral sudden hearing loss, tinnitus, vertigo and unsteadiness. There is usually a history of barotrauma, head trauma or ear trauma.

Superior semicircular canal dehiscence

This is characterised by vertigo and the apparent motion of objects that are known to be stationary in response to loud noises. Symptoms can be triggered by heavy lifting, straining or coughing. Other symptoms include fullness in the ear and autophony (which is 'hearing oneself', when sounds from inside the body such as breathing, heartbeat and blood flow can be heard).

Vertebrobasilar insufficiency

The blood supply to the brainstem, cerebellum and inner ear is derived from the vertebrobasilar system. Any major branch occlusion (through atherosclerosis) can cause vertigo and is the most common symptom and is also often the initial symptom. Dizziness or fainting is also frequently reported. The diagnosis usually relies on a history of symptoms, such as loss of vision, diplopia, confusion, numbness or tingling, slurred speech and loss of coordination. Risk factors are those associated with atherosclerosis such as smoking, hypertension, older age, hyperlipidaemia and family history.

Red flags indicative of referral: Dizziness and vertigo

Reason for referral	Why referring	Timeframe for referral
• Severe nausea and vomiting	• Potential for dehydration	• Same day
• Shortness of breath	• Suggests a cardiovascular cause or carbon monoxide poisoning	
• Neurologic symptoms	• Suggests vertebrobasilar insufficiency or multiple sclerosis	
• Sudden onset not provoked by positional change	• Suggests nonvestibular cause	• As soon as practicable
• Unilateral hearing loss	• Suggests aural growths or fistula	

Evidence base for over-the-counter medication

BPPV and vestibular neuronitis often spontaneously resolve but can take weeks. Ménière disease usually requires medication, which include antihistamines (e.g., cinnarizine, cyclizine and promethazine) and prochlorperazine for acute attacks and betahistine for prevention. None of these has a licence for OTC use to treat. Current evidence for these products is limited. Betahistine was subject to a Cochrane review, which concluded that trial data were inconclusive as to whether betahistine was effective.

Practical prescribing

There is an obvious risk to the person themselves and others they interact with if they experience dizziness or vertigo. Advise the person to avoid driving, and the workplace should be informed when it may pose risk (James & Burton, 2001).

Reference

James, A., & Burton, M. J. (2001). Betahistine for Ménière's disease or syndrome. *Cochrane Database System Review, 1*, CD001873.

Further reading

Post, R. E., & Dickerson, L. M. (2010). Dizziness: A diagnostic approach. *American Family Physician, 82*, 361–368.

Website

The Ménière's Society. http://www.menieres.org.uk

Self-assessment questions

The following questions are intended to supplement the text. Two levels of questions are provided, multiple-choice questions and case studies. The multiple-choice questions are designed to test factual recall, and the case studies allow knowledge to be applied to a practice setting.

Multiple-choice questions

5.1. Which ONE of the following anatomic features is responsible for most sound collection?

a. Tympanic membrane
b. The pinna
c. Tragus
d. Antihelix
e. Helix

5.2. Which ONE of the following anatomic features bulges in the presence of infection?

a. Eustachian tube
b. Mastoid area
c. The ear canal
d. The pinna
e. Tympanic membrane

5.3. Which ONE of the listed products has the most evidence of efficacy in treating earwax?

a. Oil-based products (e.g., Cerumol)
b. Peroxide-based products (e.g., Otex)
c. Saline
d. Water-based products (e.g., sodium bicarbonate)
e. All products are comparable

5.4. From the list of symptoms below, which ONE of the following is most closely associated with outer ear problems?

a. Deafness and dizziness
b. Discharge and deafness
c. Dizziness and tinnitus
d. Itch and pain
e. Pain and discharge

5.5. Tenderness associated with manipulation of the tragus is associated with which ONE of the following?

a. Inner ear problem
b. Mastoiditis
c. Middle ear problem
d. Outer ear problem
e. Perichondritis

5.6. Which ONE of the listed patient groups is most susceptible to have earwax impaction?

a. All groups are equally susceptible
b. Middle-aged adults
c. Older adults
d. Young adults
e. Young children

5.7. On examination of the ear, you observe a pearly white lesion on the tympanic membrane. The patient has had some hearing loss and a recently perforated tympanic membrane. Which ONE of the following is the most likely diagnosis?

a. Cerumen impaction
b. Cholesteatoma
c. Glue ear
d. Mastoiditis
e. Otosclerosis

5.8. Mrs Brown brings in her 8-year-old son, who has been complaining of ear pain that he has had for the past 24 hours. He is generally well, and an otoscopic investigation reveals a red-yellow, bulging tympanic membrane. What course of action will you take?

a. Tell Mrs Brown her son has otitis media, and the symptoms will resolve on their own. No further action is required.
b. Tell Mrs Brown her son has otitis media, and the symptoms will resolve on their own. The pain can be managed with simple analgesia.
c. Tell Mrs Brown her son has otitis media, and the symptoms will resolve on their own. However, it would be best to get him checked out by the GP.
d. Tell Mrs Brown her son has otitis media, and the symptoms will NOT resolve on their own. He needs antibiotics and must see the doctor.
e. Tell Mrs Brown her son has otitis media, and the symptoms will resolve on their own. The pain can be managed with ear drops.

5.9. Which ONE of the following conditions is least associated with progressive deafness?

a. Otitis media with effusion
b. Otosclerosis
c. Medicine-induced deafness
d. Ménière disease
e. Presbycusis

5.10. An adult patient presents with unilateral deafness and tinnitus. Based on these symptoms, which ONE of the following is the most likely diagnosis?

a. Exostoses
b. Foreign body
c. Ménière disease
d. Otosclerosis
e. Presbycusis

5.11. Mr Burnett, a 48-year-old male, enters the pharmacy and wants some advice about a sore ear that he has experienced for the past 3 days. He describes having some local itching and pain. Which ONE of the following is the most likely diagnosis?

a. Local inflammation of the pinna
b. Otitis externa
c. Perichondritis
d. Otitis media
e. Ménière disease

5.12. In which ONE of the following age groups is otitis media most prevalent?

a. 0 to 4 years
b. 4 to 6 years
c. 7 to 9 years
d. 10 to 12 years
e. Older than 12 years

5.13. If a patient complains of tinnitus and deafness, which ONE of the following is the most likely part(s) of the ear that is affected?

a. Outer ear
b. Middle ear
c. Inner ear
d. Either middle or outer ear
e. Inner and middle ear

5.14. Which ONE of the following patient groups is most predisposed to otitis externa?

a. Patients with seborrhoeic dermatitis
b. Patients with acne vulgaris
c. Patients with tinea corporis
d. Patients with discoid eczema
e. Patients with lichen planus

5.15. Which ONE of the following symptom clusters is suggestive of a middle ear problem?

a. Itch, pain and discharge
b. Pain, discharge and deafness
c. Deafness, dizziness and tinnitus
d. Pain only
e. Itch only

5.16. Which ONE of the following ways is the best way to view the ear canal of an adult?

a. Pull the pinna up and back to straighten the ear canal.
b. Pull the pinna down and back to straighten the ear canal.
c. Pull the pinna up and forward to straighten the ear canal.
d. Pull the pinna down and forward to straighten the ear canal.
e. Pull the pinna back to straighten the ear canal.

Questions 5.17 to 5.25 concern the following signs and symptoms:

A. Itch

B. Discharge

C. Deafness

D. Earache

E. Localised ear swelling

F. Lesions slow to heal

G. Vertigo

H. Dizziness

Select from A to H which of the above is most associated with the following conditions:

5.17. Otitis media

5.18. Earwax

5.19. Perichondritis

5.20. Otitis externa

5.21. Cholesteatoma

5.22. Malignancy

5.23. Labyrinthitis

5.24. Ménière disease

5.25. Glue ear

Answers

5.1. Answer: b

Rationale: Structures c to e (tragus, antihelix and helix) help with but are principally involved in sound collection; the tympanic membrane (a) receives sound rather than collects it.

5.2. Answer: e

Rationale: Pressure increases from a buildup of fluid cause structures to bulge. This can only happen where fluid cannot escape, which in this case is the tympanic membrane (c).

5.3. Answer: e

Rationale: Using drops of any sort appears to be better than no treatment, but it is uncertain if one type of drop is any better than another.

5.4. Answer: d

Rationale: Symptoms associated with the different ear structures do overlap. However, itching is only associated with external ear problems.

5.5. Answer: d

Rationale: The tragus is the small cartilaginous area that sits in front of the outer ear canal. Tenderness here is strongly associated with an outer ear problem and not the middle (c) or inner ear (a). The mastoid area (b) is situated behind the ear (pinna), and perichondritis (e) is an inflammation of the whole pinna.

5.6. Answer: c

Rationale: Older adults are more susceptible to impaction because of the decrease in cerumen-producing glands, resulting in drier and harder earwax.

5.7. Answer: b

Rationale: Mastoiditis (d) is not an internal problem. Wax (a) and glue ear (c) are not associated with aural lesions. Otosclerosis (e) is abnormal bone growth affecting the small bones of the ear.

5.8. Answer: b

Rationale: Patients should be managed with analgesia (paracetamol or ibuprofen) unless they are systemically unwell or are younger than 2 years and have discharge. These cases should be considered for possible antibiotics.

5.9. Answer: c

Rationale: Ototoxicity caused by medicines is associated with their introduction, so hearing difficulties are seen shortly after starting to take the medicine.

5.10. Answer: c

Rationale: Presbycusis is associated with bilateral deafness (e), and otosclerosis(d), although initially unilateral, does become bilateral. All other problems are usually unilateral. However, foreign bodies do not exhibit tinnitus. Exostoses and Ménière disease can both show tinnitus, although exostoses is a less common problem than Ménière disease.

5.11. Answer: b

Rationale: Perichondritis (c) should exhibit outer ear structure swelling. Otitis media (d) presents with pain but no itching. Ménière disease (e) exhibits dizziness or vertigo. These leaves a and b as the more likely options. Local inflammation (a) is, however, unlikely to present with itching.

5.12. Answer: a

Rationale: Epidemiologic data suggest that young children are most affected, so the answer is a.

5.13. Answer: c

Rationale: Tinnitus is a symptom most closely associated with the inner ear, so option c or e is correct. Middle ear problems are not usually associated with tinnitus, so option e is incorrect.

5.14. Answer: a

Rationale: People with seborrhoeic dermatitis (a) can experience inflammation in the ear canals and thus are more likely to develop otitis externa.

5.15. Answer: b

Rationale: Dizziness (c) or itch (a and e) should not occur; it is unusual for sole symptoms of pain (d) to be present.

5.16. Answer: a

Rationale: Because of the shape of the ear canal, an upward movement is needed, so options b, d and e are wrong. It also needs to be moved backwards, so option c is also wrong.

5.17. Answer: d

Rationale: Otitis media is a middle ear infection, and therefore localised ear swelling (e) and localised ear tenderness (g) can be ruled out, as can lesions (f). Dizziness is associated with the inner ear (h) and itch (a) and deafness (c) with the outer ear. This leaves discharge (c) and earache (d) as the only two options remaining. Both are associated with middle ear problems, but earache is the common presentation before discharge may be seen.

5.18. Answer: c

Rationale: Earwax is associated with the outer ear; therefore, symptoms involving the middle or outer ear can be discounted, although outer and middle ear symptoms can overlap. Certainly, dizziness (h) and earache (d) can be excluded. Like 5.17, ear swelling (e), tenderness (g) and lesions (f) can be ruled out. This leaves options of itch (a), discharge (b) or deafness (c). Itch (a) is a symptom of otitis externa, and discharge (b) is a symptom of otitis media (b). Deafness (c) is the correct answer.

5.19. Answer: e

Rationale: Perichondritis affects the outer structure of the ear, so all options can be excluded except for ear swelling (e).

5.20. Answer: a

Rationale: See answer 5.18.

5.21. Answer: b

Rationale: Growths in the ear canal are normally benign and tend to cause discharge and later can reduce the amount of sound reaching the tympanic membrane, causing gradual hearing loss.

5.22. Answer: f

Rationale: Ear malignancies are usually located on the outer structures of the ear and are observed as some form of growing lesion.

5.23. Answer: h

Rationale: Only labyrinthitis causes dizziness.

5.24. Answer: g

Rationale: Only Ménière disease causes vertigo.

5.25. Answer: c

Rationale: This is a chronic problem affecting the middle ear that tends to be symptomless, apart from varying degrees of deafness.

Case studies

CASE STUDY 5.1

Mr SW has asked to speak to the pharmacist because his left ear is bothering him. He has had the symptoms for 3 or 4 days now. He describes the symptoms as his ear feeling full, and he can no longer hear out of it very well. He is otherwise fit and healthy.

a. State the problem representation.

Adult male presents with acute left ear deafness with associated aural fullness.

b. Based on this description, what would be your differential diagnosis?

Earwax. You ask if it is OK to look in his ear with an otoscope to confirm your differential diagnosis.

c. How would a physical examination help to confirm or refute your diagnosis?

You would expect to see visible earwax impaction, and if the eardrum were observable, this should be normal and show no redness, bulging or loss of landmarks.

d. What safety netting would you put in place?

To recap, safety netting should include three components:

- *What you think the problem is and what you expect to happen*
- *How the person would know if you are wrong*
- *What they should do then*

In this case you should inform them that you think the problem is caused by earwax. The problem should resolve on its own in a few days, but they could use an ear to see if it helped. You should advise him to return in 5 to 7 days if the symptoms have not improved to recheck his ears to make sure it is earwax and nothing else. At that point, it may be worthwhile thinking about ear irrigation.

CASE STUDY 5.2

Mrs PR asks to speak to the pharmacist about her 7-year-old son Luke. She wants some Calpol to treat his earache.

a. Based on this presentation, what would be your initial thoughts on a differential diagnosis?

Otitis media immediately springs to mind. It is a common complaint among children. It is, however, more common in younger children than this patient.

b. Basing your initial thoughts on a diagnosis of otitis media, what questions would you ask to help confirm these thoughts?

***Onset of symptoms**: Acute otitis media presents quickly.*

***Systemic symptoms present?** Fever and malaise can be seen in acute otitis media but also complications such as mastoiditis.*

You find out that the earache has been present for a day or so, and Luke is more irritable than normal. Mrs PR says he feels hot, but she has not actually taken his temperature. Apart from this, Luke has no other symptoms. These findings are consistent with acute otitis media. You decide to examine his ear using an otoscope.

c. If the patient has acute otitis media, what findings would you expect?

Inspection of the outer ear and structures will be normal as will the external ear canal. The tympanic membrane should show signs of redness, bulging and a loss of landmarks.

Inspection shows the outer ear is normal, and the ear canal shows no redness, but the tympanic membrane is swollen and red.

You are confident that Luke has otitis media.

d. What management plan will you put in place?

Giving Calpol seems reasonable, and Mrs PR could buy some for Luke.

e. What safety netting will you put in place?

You tell Mrs PR that Luke seems to have an ear infection, but because he seems reasonably well, there is no need for antibiotics currently. Giving paracetamol should help with the pain. You tell her the symptoms should settle down over the next 48 hours, but if symptoms worsen over this time, then antibiotics will probably be needed.

Chapter 6

Central nervous system

CHAPTER OUTLINE

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Background

The number of patient requests for advice and products to treat headache and insomnia make up a smaller proportion of pharmacist's workload than other conditions, yet sales for analgesics and hypnotics are extremely high (£693 million for pain relief and £61 million for sleep aids in 2021).

General overview of central nervous system anatomy

The central nervous system (CNS) includes the brain and spinal cord. Its major functions are to process and integrate information arriving from sensory pathways and communicate appropriate responses back via afferent pathways. CNS anatomy is complex and outside the scope of this text. Readers are referred to any good anatomic text for a comprehensive description of CNS anatomy.

History taking

A differential diagnosis will be made solely from questions asked of the patient. It is especially important that a social and work-related history is sought because pressure and stress are implicated in conditions such as headache and insomnia.

Headache

Background

Headache is not a disease state or condition but rather a symptom, of which there are many causes. Headache can be the major presenting complaint (e.g., in migraine, cluster and tension-type headaches) or one of many symptoms (e.g., in an upper respiratory tract infection). This section concentrates on the differentiation of conditions in which headache is a predominant symptom. Furthermore, the International Headache Society classification (http://www.ichd-3.org) distinguishes between primary and secondary headache disorders. This is useful to community pharmacists because any secondary headache disorder is symptomatic of an underlying cause and would normally require referral.

Prevalence and epidemiology

The exact prevalence of headache is not precisely known. However, virtually everyone will have had a headache at some time; it is probably the most common pain syndrome experienced by people.

It has been estimated that up to 80% to 90% of the population will experience one or more headaches per year. Tension-type headache has been reported to affect between 30% and 80% of people in Western countries, with age prevalence peaking between 30 to 40 years. Migraine can occur at any age but is most common between 25 and 55 years and is approximately two to three times more common in females than males. Conversely, cluster headache is more common in males; episodic cluster headache, which accounts for 90% of cases, is about 4 times more common and chronic cases 15 times more common in males than females. The age of onset is usually from 20 to 40 years.

Aetiology

Considering headache affects almost everyone, the mechanisms that cause headache are still poorly understood. Pain control systems modulate headaches of all types, independent of the cause. However, the exact aetiology of tension-type headache and migraine are still to be fully elucidated. Tension-type headache is commonly referred to as muscle contraction headache because electromyography has shown pericranial muscle contraction, often exacerbated by stress. However, similar muscle contraction is noted in people with migraine, so this theory has now fallen out of favour. Consequently, no current theory for tension-type headache is unanimously endorsed, but recent studies suggest a neurobiological basis.

Traditionally, migraine was thought to be a result of abnormal dilation of cerebral blood vessels, but this vascular theory cannot explain all migraine symptoms. The use of 5-HT$_1$ agonists to reduce and stop migraine attacks suggests some neurochemical pathophysiology. Migraine is therefore probably a combination of vascular and neurochemical changes, the neurovascular hypothesis. Migraine also appears to have a genetic component, with about 70% of patients having a first-degree relative with a history of migraine.

Arriving at a differential diagnosis

The overwhelming majority of patients (80–90%) present with a tension-type headache or migraine (10%). However, there are many other causes in which headache is a predominant symptom (Table 6.1), and a number of headache-specific questions should be asked to help establish a differential diagnosis (Table 6.2).

Clinical features of tension-type headache

Headaches are typically recurrent and last from 30 minutes to 7 days. Pain is bilateral, generalised and nonthrobbing (Fig. 6.1). The patient might describe the pain as tightness or a weight pressing down on the head. The pain is gradual in onset and tends to worsen progressively throughout the day. Pain is normally mild to moderate and is not aggravated by movement, although it is often worse under pressure or stress. Nausea and vomiting are not associated with tension-type headache, and it rarely causes photophobia or phonophobia. Overall, the headache has a limited impact on the individual, although they might have tried over-the-counter (OTC) medication without complete symptom resolution or say that the headaches are becoming more frequent.

Table 6.1
Causes of headache and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Tension-type headache
Likely	• Eye strain • Migraine • Sinusitis
Unlikely	• Cluster headache • Giant cell arteritis • Medication overuse headache • Neck pain/cervical spondylosis • Trigeminal neuralgia
Very unlikely	• Carbon monoxide poisoning • Glaucoma • Meningitis • Increased intracranial pressure • Subarachnoid haemorrhage

Tension-type headaches can be classed as either episodic or chronic. Episodic tension-type headache can be further subdivided into infrequent and frequent forms. Episodic infrequent is classed as at least 10 episodes of headache occurring on less than 1 day per month on average; frequent forms see at least 10 episodes of headache occurring on fewer than 15 days per month on average for more than 3 months. Chronic forms are classed when there are more than 15 episodes per month.

Most patients will present to pharmacists with the infrequent episodic form.

Conditions to eliminate

Likely causes

Migraine

There are two major subtypes of migraine, headache with aura (classic migraine) and headache without aura (common migraine). Both types can be divided into three phases:

- Phase 1: This is the premonitory phase, which can occur hours or possibly a couple of days before the headache. The patient might complain of a change in mood or notice a change in behaviour. Feelings of well-being, yawning, poor concentration and food cravings have been reported. These prodromal features are highly individual but are relatively consistent for each patient. Identification of triggers is sometimes possible (Table 6.3), but detecting triggers is complicated because they appear to be cumulative, jointly contributing to a threshold above which attacks are initiated.
- Phase 2: This is headache with or without aura.
- Phase 3: This is the resolution phase. As the headache subsides the patient can feel lethargic, tired and drained before recovery, which might take several hours.

Migraine attacks last anywhere from 4 to 72 hours, with the average length of an attack being 24 hours.

Table 6.2
Specific questions to ask the patient: Headache

Question	Relevance
Age and onset of headache	• In early childhood or as a young adult, primary headache is most likely. After 50 years of age, the likelihood of a secondary cause is much greater. • Headache that follows head trauma might indicate postconcussive headache or intracranial pathology.
Frequency and timing	• Headache associated with the menstrual cycle or at certain times (e.g., weekend, holiday) suggests migraine. • Headaches that occur episodically at the same time of day or night suggest cluster headache. • Headaches that occur on most days with the same pattern suggest tension-type headache.
Location of pain (see Fig. 6.1)	• Cluster headache is nearly always unilateral in the frontal and ocular areas (can also be felt in the temporal areas). • Migraine headache is unilateral in 70% of patients but can change from side to side and from attack to attack. • Tension-type headache is often bilateral, either in frontal or occipital areas. • Very localised pain suggests a secondary cause. • Sinusitis is frontal and located around the eyes or nose.
Severity and nature of pain	• Severe to intense ache or throbbing suggests haemorrhage or aneurysm. • Piercing, boring, searing eye pain suggests cluster headache. • Moderate to severe throbbing pain that often starts as dull ache suggests migraine. • Dull and bandlike pain suggests tension-type headache.
Attack duration	• Typically, migraine attacks last between a few hours and 3 days. • Tension-type headaches last between a few hours and several days, such as 1 week or longer. • Cluster headache will only normally last 2–3 hours.
Associated symptoms	• Headache and fever at the same time imply an infectious cause. • Nausea suggests migraine or more sinister pathology, such as a subarachnoid haemorrhage and space-occupying lesions. • Scalp tenderness is associated with giant cell arteritis.
Contributing factors	• Stress can lead to or make tension-type headaches worse. • Triggers can be identified that precipitate migraine (see Table 6.3).

Headache with aura (classic migraine)

The aura, which is fully reversible, develops over 5 to 20 minutes and can last for up to 1 hour. It can be visual (accounts for ~90% of auras experienced) or neurologic. Visual auras can take many forms, such as scotomas (blind spots), fortification spectra (zigzag lines) or flashing and flickering lights. Neurologic auras (pins and needles) typically start in the hand, migrating up the arm before jumping to the face and lips. The headache usually starts within 60 minutes of the aura's ending. Pain is unilateral, throbbing and moderate to severe. Sometimes the pain becomes more generalised and diffuse. Nausea affects almost all patients. but less than one-third of patients vomit. Photophobia and phonophobia are also common symptoms and often mean that patients seek out a dark quiet room to relieve their symptoms. Physical activity and movement tend to intensify the pain.

Headache without aura (common migraine)

Those who do not experience aura show the same pattern of headache symptoms as those with classic migraine.

Eye strain

People who perform prolonged close work (e.g., visual display unit operators) can have frontal-aching headaches. In the first case, patients should be referred to an optician for a routine eye check.

Sinusitis

Sinusitis can affect any age group, although it is more common in adults. Symptoms that are highly suggestive of sinusitis are nasal obstruction and discharge and facial pain. The pain in the initial stages tends to be relatively mild and localised, usually unilateral and dull, but becomes bilateral and more severe the longer the condition persists. Bending forward often exacerbates the pain (moving the eyes from side to side and coughing or sneezing can also increase the pain), and the sinuses will be tender when gently palpated. If the ethmoid sinuses are involved, retro-orbital pain (behind the eye) is often experienced. Other symptoms include frontal headache, fever and loss of smell.

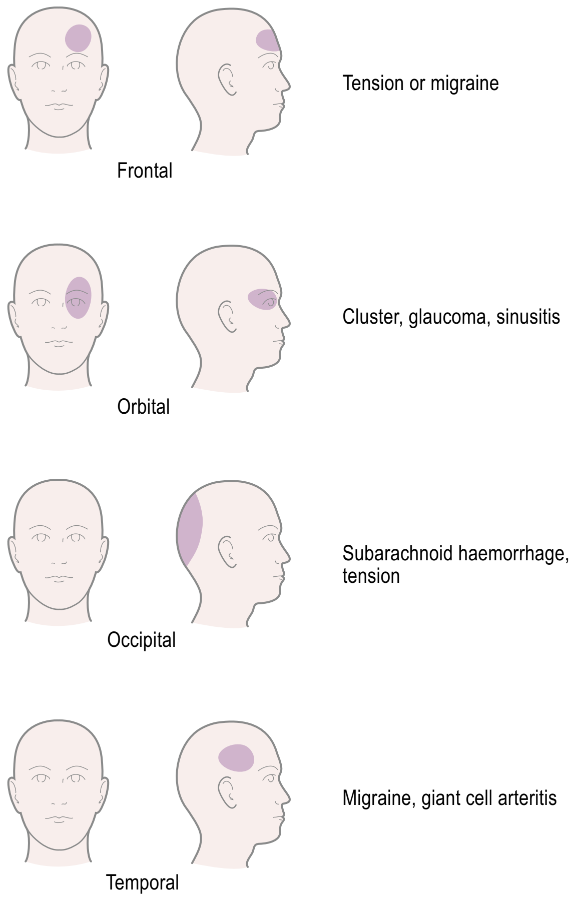
Tension or migraine
Frontal
Cluster, glaucoma, sinusitis
Orbital
Subarachnoid haemorrhage, tension
Occipital
Migraine, giant cell arteritis
Temporal

Fig. 6.1 Location of pain in headache.

Table 6.3
Triggers and possible strategies to reduce migraine attacks

Trigger	Strategy
Stress	• Maintain a regular sleep pattern. • Perform regular exercise. • Modify the work environment. • Do relaxation techniques, such as yoga.
Diet: any food can be a potential trigger, but food that is implicated includes cheese, citrus fruit and chocolate	• Maintain a food diary. If an attack occurs within 6 hours of food ingestion and is reproducible, it is likely that it is a trigger for migraine. • Eat regularly and do not skip meals.
Menstruation	
Lack of exercise	

Unlikely causes

Cluster headache

Cluster headache presents with short-lasting (15 minutes to 3 hours) severe unilateral orbital or temporal pain that causes the patient to be restless (e.g., pacing the floor) because of pain severity. Typically, the headache occurs at the same time each day. Additionally, conjunctival redness or eye watering, drooping and swelling of one eyelid and nasal congestion (which laterally becomes watery) are observed on the painful side of the head. Facial flushing and sweating are common.

The condition is categorised into episodic or chronic forms. Episodic cluster headache is characterised by periods of acute attacks, typically lasting a number of weeks to a few months, with people experiencing between one and three attacks per day. This is then followed by periods of remission, which can last months or years. During acute phases, alcohol can trigger an attack. Nausea is usually absent, and a family history is uncommon. In chronic forms, attacks occur for 1 year or more with either short or no remission periods. Triptan therapy (subcutaneous or intranasal) is recommended.

Giant cell arteritis

The temporal arteries, which run vertically up the sides of the head, just in front of the ears, can become inflamed. Giant cell arteritis is characterised by new-onset headache in which the pain is constant, around the temples and generally unilateral, although it can be bilateral. Scalp tenderness and pain on chewing is seen in about 50% of patients and double vision or visual loss is also seen. The person generally feels unwell, with fever and fatigue. It is most seen in older white populations and is three times more common in females. Urgent referral is needed for prompt treatment with oral corticosteroids because the retinal artery can become compromised, leading to blindness.

Medication-overuse headache

Patients with long-standing symptoms of headache who regularly use medicines to treat pain can develop medication-overuse headache. Pain receptors (nociceptors), instead of being switched off when analgesics are taken, are in fact switched on. The consequence is a cycle in which patients take more and more painkillers that are increasingly stronger to control the pain. Patients experience daily or near-daily headaches described as dull and nagging. Obviously, in these cases, a medication history is essential. Treatment is to stop all analgesia for a number of weeks, which requires careful planning and is beyond the scope of most pharmacists. Symptoms usually resolve within 2 months of withdrawing the medication.

Neck pain or cervical spondylosis

This is normally a problem in older adults. Mild to moderate pain is described as aching and is experienced at the back of the head, although it can become more generalised. Pain tends to come and go and is worse on neck movement.

Trigeminal neuralgia

Pain follows the course of the second (maxillary, supplying the cheeks) or third (mandibular, supplying the chin, lower lip and lower cheek) division of the nerve, leading to pain experienced in the cheek, jaws, lips or gums. Pain is short lived, typically lasting a few seconds, but may last up to a couple of minutes. Pain is severe and lancing (electric shock–like) and is almost always unilateral. Pain can be triggered by simple tasks such as brushing teeth, air moving across the face (e.g., being out in the wind) or light touch to the skin of the face. The person may experience multiple attacks a day, although the events are episodic and may remit for weeks or months before returning. It is more common in females than in males and rarely seen before the age of 40 years.

Very unlikely causes

Carbon monoxide poisoning

Low levels of carbon monoxide exposure tend to present with headache symptoms that are similar to a tension-type headache, although the headache tends to have a throbbing quality. Symptoms are constant whilst exposed but disappear when away from the exposure. Other people in the same location should also experience symptoms. Besides headache, other symptoms such as dizziness and sickness can be experienced.

Glaucoma

Patients experience a frontal-orbital headache, with severe pain in the eye. The eye appears red and is painful. Vision is blurred, the cornea can look cloudy and halos might be noticed around the vision. For further information on glaucoma, see the section on red eye in Chapter 4.

Meningitis

Signs and symptoms are nonspecific in the early stages of the disease and are similar to those of flu but can develop quickly to severe generalised headache associated with fever (although neonates may not have fever), an obviously ill patient, neck stiffness, nausea and vomiting. A nonblanching purpuric rash is classically associated with meningitis. However, not all patients exhibit all symptoms, and any child that has difficulty in placing the chin on the chest and is running a temperature above 38.9°C (102°F) should be referred urgently.

Subarachnoid haemorrhage

The patient will experience an incapacitating headache with very intense severe pain, located in the occipital region. Nausea and vomiting are often present, and a decreased lack of consciousness is prominent. Patients often describe the headache as the worst headache they have ever had. It is extremely unlikely that a patient would present in the pharmacy with such symptoms. Immediate referral to the accident and emergency department is needed.

Conditions causing increased intracranial pressure

Space-occupying lesions (e.g., brain tumour, haematoma, abscess) can give rise to varied headache symptoms ranging from severe chronic pain to intermittent moderate pain. Pain can be localised or diffuse and tends to be more severe in the morning, with a gradual improvement over the next few hours. Coughing, sneezing, bending and lying down can worsen the pain. Nausea and vomiting are common. After a prolonged period, neurologic symptoms, such as drowsiness, confusion, lack of concentration, difficulty with speech and paraesthesia, start to become evident.

Any patient with a recent history (lasting 2–3 months) of head trauma, headache of long-standing duration or insidious worsening of symptoms, especially associated with decreased consciousness and vomiting, must be referred urgently for fuller evaluation.

Fig. 6.2 and Table 6.4 will help in the differentiation of serious and nonserious causes of headache.

Red flags indicative of referral: Headache

Reason for referral	Why referring	Timeframe for referral
• Headache in children younger than 12 years old who have a stiff neck, high temperature or skin rash	• Suggests meningitis	• Immediate referral to general practitioner (GP) or accident and emergency department
• Headache after recent (3 months) trauma or injury	• Suggests haematoma	• Urgent GP referral
• Nausea or vomiting in the absence of migraine symptoms • Neurologic symptoms, especially change in consciousness • Very sudden or severe onset of headache • New or severe headache in patients older than 50 years of age • Progressive worsening of headache symptoms over time	• All can suggest sinister pathology and require further investigation	
• Headache unresponsive to analgesics	• Simple analgesia is effective; if this has not worked, the patient's symptoms require further investigation	• As soon as practicable

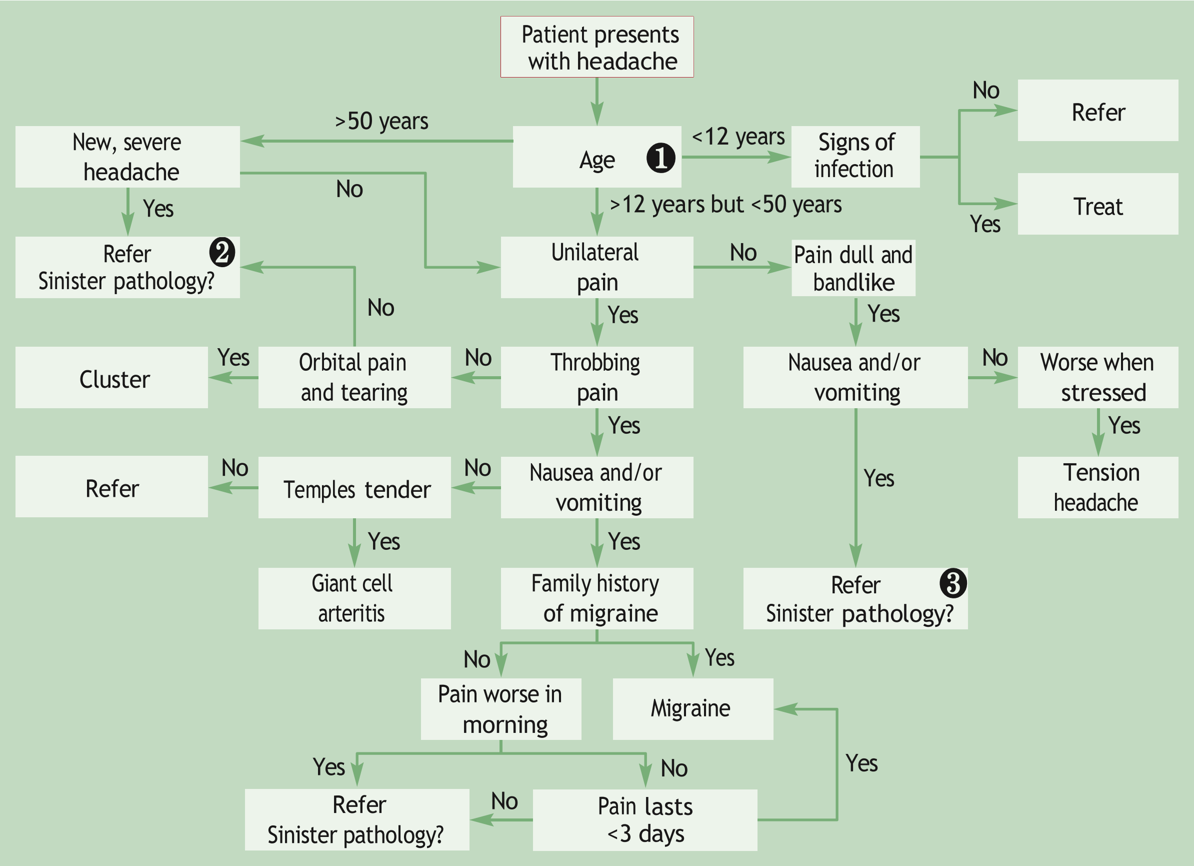
Patient presents with headache
>50 years
New, severe headache
Age ❶
<12 years
Signs of infection
No
Refer
Yes
Treat
>12 years but <50 years
No
Yes
Refer Sinister pathology? ❷
No
Unilateral pain
No
Pain dull and bandlike
Yes
Yes
Cluster
Yes
Orbital pain and tearing
No
Throbbing pain
Nausea and/or vomiting
No
Worse when stressed
Yes
Yes
Tension headache
Refer
No
Temples tender
No
Nausea and/or vomiting
Yes
Yes
Yes
Giant cell arteritis
Family history of migraine
Refer Sinister pathology? ❸
No
Yes
Pain worse in morning
Migraine
Yes
No
Yes
Refer Sinister pathology?
No
Pain lasts <3 days

Fig. 6.2 Primer for differential diagnosis of headache.

❶ Age. Caution should be exercised in children who present with headache. Although most headaches do not have an organic cause, children younger than 12 years are probably best referred if they show no signs of a systemic infection (e.g., fever, malaise).

❷ With increasing age, it is more likely that a sinister cause of headache is responsible for the symptoms, especially if the patient has not experienced similar headache symptoms before. Mass lesions (tumours and haematoma) and giant cell arteritis should be considered.

❸ Referral for suspected sinister pathology. Nausea and vomiting in the absence of migraine-like symptoms should be treated seriously. Mass lesions and subarachnoid haemorrhage need to be eliminated.

Evidence base for over-the-counter medication

Simple analgesia

Migraine

Simple analgesia (e.g., paracetamol, aspirin, ibuprofen) has shown clinical benefit in relieving migraine attacks. A Cochrane review (Derry & Moore, 2013) involving 11 studies (*n* = 2942) compared paracetamol 1000 mg, alone or in combination with an antiemetic, with placebo or other active comparators, mainly sumatriptan 100 mg. Paracetamol as a single oral dose of 1000 mg was statistically superior to placebo for all outcomes. However, the number needed to treat (NNT) of 12 for pain-free response at 2 hours was inferior to other commonly used analgesics.

Ibuprofen's effect on migraine was reviewed by Rabbie et al. (2013). They looked at nine studies (*n* = 4373) and found it to be an effective treatment for treatment of patients with acute migraines, providing pain relief in about half of people with the condition. The review concluded that the 400-mg dose was superior to the 200-mg dose for all outcomes evaluated.

Likewise, aspirin's effect has also been reviewed. Kirthi et al. (2013) assessed 13 studies (*n* = 4222) and found that 1000 mg of aspirin was effective, with an NNT of 8 for pain-free response at 2 hours.

Tension-type headache

Aspirin, ibuprofen and paracetamol were reviewed for episodic tension-type headache in adults. Stephens et al. (2016) investigated 23 trials involving paracetamol (*n* = 8079 people). Paracetamol at a dose of 1000 mg was found to provide a small benefit in terms of being pain free at 2 hours. Derry et al. (2015) investigated ibuprofen at a dose of 400 mg and included 12 studies (*n* = 3094 people); they found stronger evidence than paracetamol for being pain free at 2 hours. Finally, Derry et al. (2017) also reviewed aspirin and reviewed five studies (*n* = 1812 people). Unlike the two other reviews, there were no data reported about being pain free at

Table 6.4
Condition summary for headache

	Duration	Timing and nature of pain	Location	Severity	Precipitating factors	Who is affected	Associated symptoms
Cluster headache	15 minutes to 3 hours	Attacks occur at the same time of day (often night); intense boring pain	Unilateral orbital and/or temporal	Severe	Alcohol	Adults; three to five times more common in males	Eye redness, nasal congestion, facial flushing, sweating
CO poisoning	Constant during exposure	Throbbing	Diffuse	Mild	None	All ages	Nausea, vomiting, vertigo, alteration in consciousness
Eye strain	Days	Aching	Frontal	Mild	Close vision work	All ages	Eye soreness, increased sensitivity to light, neck stiffness
Giant cell arteritis	Hours to days	Pain constant	Around temples, often both sides	Severe	History of polymyalgia rheumatica	Older adults; females more than males	Temporal artery tenderness sometimes noticed, e.g., when brushing hair; double vision and visual loss (30%); pain on chewing; systemic symptoms of fever, fatigue and weight loss
Glaucoma	Hours	Often in the evening and sudden onset	Unilateral and orbital	Severe	Darkness	Older adults	Red eye, blurred vision, impaired visual acuity, halos around lights, nausea and vomiting
Meningitis	Hours to days	Migraine-like	Generalised	Severe	None	Children and adolescents	Neck rigidity, sudden high fever, altered mental or neurologic changes besides nausea, vomiting along with the inability to tolerate light or loud sounds
Migraine	4–72 hours	Throbbing pain	Usually unilateral	Moderate to severe	Food, menstrual cycle, stress, family history	Adults; three times more common in females than males	Nausea, dislike of bright lights and loud noise, reversible aura

Continued

Table 6.4
Condition summary for headache (Continued)

	Duration	Timing and nature of pain	Location	Severity	Precipitating factors	Who is affected	Associated symptoms
Neck pain and cervical spondylosis	Usually comes and goes	Aching	Back of the head and can travel forward	Mild to moderate	None	Older adults	Pain may get worse on neck movement
Increased intracranial pressure	Days to months	Constant; worse in the mornings	Variable	Moderate	Movement or straining	Older adults	Blurred vision, vomiting, changes in behaviour
Sinusitis	Days	Dull ache (though can be throbbing) that starts off being unilateral	Frontal	Mild to moderate	Pain can worsen on bending forward; recent history of an URTI	Adults	Nasal blockage or discharge, reduction in sense of smell, localised tenderness
Subarachnoid haemorrhage	Minutes (1–5) up to 1 hour	Variable	Occipital	Severe	None	Adults	Neck stiffness, visual disturbance, vomiting
Tension-type headache	Hours to days	Symptoms worsen as day progresses; nonthrobbing pain	Bilateral and most often at the back of the head	Mild to moderate	Stress caused by changes in work or home environment	All ages	None
Trigeminal neuralgia	Seconds to Minutes	Lancing or electric shock–like pain at any time	Unilateral, face	Severe	None	Adults	In some people, nasal congestion or discharge, facial sweating and conjunctivitis

CO, Carbon monoxide; *URTI,* upper respiratory tract infection.

2 hours; the authors found that a single dose of aspirin between 500 mg and 1000 mg provided some benefit, but data were based on relatively poor studies.

Combinations of simple analgesics with codeine are available and are promoted for strong pain relief. However, there is doubt whether the amount of codeine in these preparations is sufficient to provide any additional pain relief (Murnion, 2010). Furthermore, there is growing evidence of problems with the overuse of these products, resulting in dependence on the codeine components (Frei et al., 2010).

Migraleve

Migraleve is available as Migraleve Pink tablets, which contain a paracetamol–codeine combination (500/8 mg) plus buclizine, 6.25 mg, or Migraleve Yellow tablets, which contain only the analgesic combination. A number of trials have investigated Migraleve Pink tablets against placebo, buclizine and ergotamine products.

A review of two trials in which Migraleve was compared against buclizine (Jorgensen et al., 1974) and placebo (Scopa et al., 1974) showed that Migraleve was as effective as buclizine and superior to placebo in reducing the severity of migraine attacks. However, patient numbers were small (*n* = 21 and 20, respectively), and statistical significance was not reported. Compared with ergotamine-containing products, Migraleve was equally as effective as Migril in treating patients with migraine (Anonymous, 1973). However, the results should be viewed with caution because the trial suffered from poor design and lacked randomisation, placebo and proper blinding. A further trial (Carasso & Yehuda, 1984) also reported beneficial effects of Migraleve. The most recent trial (Adam, 1987) was well designed, being a double-blind, randomised, placebo-controlled trial. The author concluded that compared with placebo, Migraleve did significantly reduce the severity of attacks but not their total duration.

Midrid

Midrid capsules contain isometheptene mucate 65 mg and paracetamol 325 mg. A number of trials have investigated the effect of Midrid on reducing the severity of migraine attacks. Two studies (Diamond, 1976; Diamond & Medina, 1975) using similar methodology investigated isometheptene versus placebo and paracetamol. Both were double-blind, placebo-controlled trials and had identical inclusion criteria. The 1975 trial concluded that isometheptene was superior in relieving headache severity compared with placebo, although the dose of isometheptene used was double that of Midrid. The 1976 trial also concluded that isometheptene was significantly superior to placebo and appeared to be better than paracetamol alone, but this did not reach statistical significance. A further trial (Behan, 1978) compared Midrid with placebo and ergotamine. The author concluded that Midrid was as effective as ergotamine and that both were more beneficial than placebo, although it is unclear whether this was statistically significant.

In summary, limited trial data for both Migraleve and Midrid exist but suggest that they might be more effective than placebo.

Prochlorperazine (Buccastem M)

Prochlorperazine has been found to be a potent antiemetic in a number of conditions, including migraine. It works by blocking dopamine receptors found in the chemoreceptor trigger zone.

Sumatriptan

Triptans are 5-HT$_1$ agonists and stimulate 5-HT$_{1B}$ and 5-HT$_{1D}$ receptors. Triptans cause constriction of the cranial blood vessels, stop the release of inflammatory neurotransmitters at the trigeminal nerve synapses and reduce pain signal transmission. As a class of medicines, they have been extensively researched. Most trials with sumatriptan (and other triptans) use endpoint data of a 2-hour pain-free response, headache relief and functional disability. In all endpoints, 100 mg of sumatriptan was significantly superior to placebo. At the lower dose of 50 mg (the OTC dose), evidence of efficacy is weaker than for 100 mg but is still effective (Derry et al., 2012).

Complementary therapies

Feverfew *(Tanacetum parthenium)* is promoted for the treatment of patients with fever, headaches and digestive problems. A Cochrane review identified six randomised, double-blind trials (*n* = 561) comparing feverfew extract or powdered feverfew with placebo in the prevention of migraine (Wider et al., 2015). One study in this review was relatively large (*n* = 218) and well conducted. This study reported that feverfew reduced migraine frequency by 1.9 attacks from 4.8 to 2.9, and placebo reduced the frequency by 1.3 from to 4.8 to 3.5, per month, resulting in a difference in effect between feverfew and placebo of 0.6 attacks per month. Overall, the authors concluded that there was low-quality evidence that feverfew is effective in migraine prevention.

Practical prescribing and product selection

Prescribing information relating to specific products marketed to treat migraine is discussed and summarised in Table 6.5, and useful tips relating to patients presenting with migraine are given in Box 6.1.

Migraleve

The dose for adults and children older than 16 years is two Migraleve Pink tablets when the attack is imminent or has begun. If further treatment is required, two Migraleve Yellow tablets can be taken every 4 hours. The dose for children aged between 12 and 15 years is half that of the adult dose. The maximum adult dose is eight tablets (two Migraleve Pink and six Migraleve Yellow) in 24 hours, and for children aged between 12 and 15 years, the maximum dose is four tablets (one Migraleve Pink and three Migraleve Yellow) in 24 hours.

The buclizine component of Migraleve Pink tablets can cause drowsiness and antimuscarinic effects, whereas the codeine content might result constipation. Other side effects are possible and are listed in Table 6.5. Buclizine and codeine can interact with other medications, especially those that cause sedation. The combined effect is to potentiate sedation, and it is important to warn the patient of this. It appears that Migraleve is safe in pregnancy, but because of the codeine component, it is best avoided in the third trimester. It is also generally safe in breastfeeding, but drowsiness in the baby is possible, and the manufacturers advise avoidance.

Midrid

Midrid is licensed for use only in adults. The dosage is two capsules at the start of an attack followed by one capsule every hour until relief is obtained. A maximum of five capsules can be taken in a

Table 6.5
Practical prescribing: Summary of medicines for migraine

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Migraleve	Older than 12 years	Headache, somnolence, dizziness, flushing, nausea and vomiting, dry mouth, sedation, constipation	Increased sedation with alcohol, opioid analgesics, anxiolytics, hypnotics, antidepressants	Glaucoma, prostate enlargement	Pregnancy: avoid in third trimester Breastfeeding OK, but infant drowsiness reported
Midrid	Adults only	Dizziness, rash	Avoid with MAOIs and moclobemide; avoid in patients taking beta blockers and TCAs	Control of hypertension and diabetes may be affected, but a short treatment course is unlikely to be clinically important	Avoid
Buccastem M	Older than 18 years	Drowsiness	Increased sedation with alcohol, opioid analgesics, anxiolytics, hypnotics, antidepressants	Patients with Parkinson disease, epilepsy, prostatic hypertrophy, glaucoma	Avoid, but evidence suggests it can be used safely
Sumatriptan	Older than 18 years	Dizziness; drowsiness; tingling feeling; warm, flushed or weak and sensation of heaviness in any part of the body; pressure in the throat, neck, chest and arms or legs; shortness of breath	MAOIs, ergotamine	Avoid in people with a previous MI, IHD, TIA, peripheral vascular disease, cardiac arrhythmia, hypertension; history of seizures; hepatic and renal impairment; atypical migraines	Avoid, but evidence suggests it can be used safely; only use if absolutely necessary

IHD, Ischaemic heart disease; *MAOI,* monoamine oxidase inhibitor; *MI,* myocardial infarction; *TCA,* tricyclic antidepressant; *TIA,* transient ischaemic attack.

12-hour period. It is a sympathomimetic agent, and like decongestants, it interacts with monoamine oxidase inhibitors (MAOIs), which might lead to fatal hypertensive crisis. It can also affect diabetes and hypertension control. Side effects reported with Midrid include transient rashes and other allergic reactions. Midrid is best avoided in pregnancy and breastfeeding because of a lack of data.

Prochlorperazine (Buccastem M)

Buccastem M is indicated for people aged 18 years and older previously diagnosed with migraine who experience nausea and vomiting. The dosage is one or two tablets twice daily. Side effects reported include drowsiness, dizziness, dry mouth, insomnia, agitation and mild skin reactions, but their incidence is not known from the available data. Because it crosses the blood–brain barrier, it potentiates the effect of other CNS depressants and interacts with alcohol. Prochlorperazine has been safely used in pregnancy, although the manufacturer advises avoidance. Minimal prochlorperazine passes into the breast milk, so as a precaution, breastfeeding should be suspended during use.

Sumatriptan (e.g., Migraitan)

Patients older than the age of 18 years but younger than 65 years of age should take a single tablet of sumatriptan as soon as possible after the onset of a headache. If the headache clears and then recurs, a second tablet can be taken, provided there was a response to the first tablet and more than 2 hours has elapsed between the first and second tablets. No more than 100 mg can be taken during any 24-hour period. If there is no response to the first tablet, a second tablet should not be taken for the same attack. Sumatriptan is associated with a well-recognised side effect profile, with the most common adverse events being dizziness; drowsiness; tingling; feeling warm, flushed or weak; a sensation of heaviness in any part of the body; shortness of breath; and pressure in the throat, neck, chest and arms or legs. Triptans are associated with rare cases of cardiac disorders; therefore,

HINTS AND TIPS BOX 6.1: MIGRAINE

Assessing pain severity	• Pain is a subjective personal experience; therefore, there are no objective measures. Using a numeric pain intensity scale should allow you to assess the level of pain the person is experiencing: 0 represents no pain and 10 the worst pain possible.
ID Migraine: This is a migraine screening tool that has shown to be valid and reliable. Nearly all patients who answer yes to two of the three questions have migraine.	• During the past 3 months, did you have any of the following symptoms together with a headache? 1. Did you feel nauseated or sick? 2. Did light bother you (a lot more than when you did not have a headache)? 3. Did your headache limit your ability to work, study, play or do what you wanted to do for at least 1 day?
Analgesia	• Recommend a soluble or orodispersible formulation to maximise absorption before it is inhibited by gastric stasis.
Administration of buccal tablets	1. Place the tablet either between the upper lip and gum, above the front teeth or between the cheek and upper gum. 2. Allow the tablet to dissolve slowly. The tablet will soften and form a gel-like substance after 1–2 hours. 3. The tablet will take from 3–5 hours to dissolve completely. If food or drinks are to be consumed during this time, place the tablet between the upper lip and gum, above the front teeth. 4. The tablets should not be chewed, crushed or swallowed. 5. Touching the tablet with the tongue or drinking fluids can cause the tablet to dissolve faster.

to allow wider availability via OTC sales, the warnings associated with prescription use have become contraindications.

Those patients' ineligible for OTC use are as follows:

- A previous myocardial infarction, ischaemic heart disease, peripheral vascular disease, cardiac arrhythmias or history of transient ischaemic attack and stroke
- Known hypertension
- History of seizures
- Hepatic and renal impairment
- Atypical migraines
- Concomitant administration of MAOIs and ergotamine or other 5-HT_1 receptor agonists

Data from use in the first trimester in pregnancy do not show increased risk of congenital defects, so it could be given. In breastfeeding, the amount of sumatriptan that reaches the infant's circulation is expected to be very low (<1%), and providing that 12 hours have elapsed since taking the dose, breastfeeding can continue.

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NICE Guidance (CG150) - Headaches in over 12s: diagnosis and management. https://www.nice.org.uk/guidance/cg150

Organisation for the Understanding of Cluster Headaches (OUCH-UK). https://ouchuk.org

The Migraine Trust. http://migrainetrust.org

Insomnia

Background

The length of sleep people need varies, but typically sleep requirements decrease with increasing age, and people older than 80 years commonly have less than 6 hours of sleep per day (Ohayon et al., 2004). Insomnia can be defined as difficulty initiating or maintaining sleep or early-morning awakening that leads to dissatisfaction with sleep quantity or quality. Insomnia is classified as either short-term or chronic. Short-term insomnia (sometimes referred to as adjustment insomnia) is typically described as lasting a few days to a few weeks but no longer than 3 months. Insomnia lasting longer than 3 months is classed as chronic.

It is likely that everyone at some point will experience insomnia because it can arise from many different causes (Fig. 6.3); however, for most people, the problem is of nuisance value, affecting next-day alertness. However, it can impair social and behavioural functioning, leading to significant distress in chronic cases.

Prevalence and epidemiology

Insomnia is a common condition with estimates of prevalence varying depending on the definitions of insomnia used. Approximately 20% to 40% of adults report occasional sleep difficulty, and insomnia increases with advancing age. Females are more affected than males.

Aetiology

Sleep is essential to allow the body to repair and restore brain and body tissues. The mechanisms controlling sleep are complex and not yet fully understood but reflect disturbances of arousal or sleep-promoting systems in the brain. Their relative activities

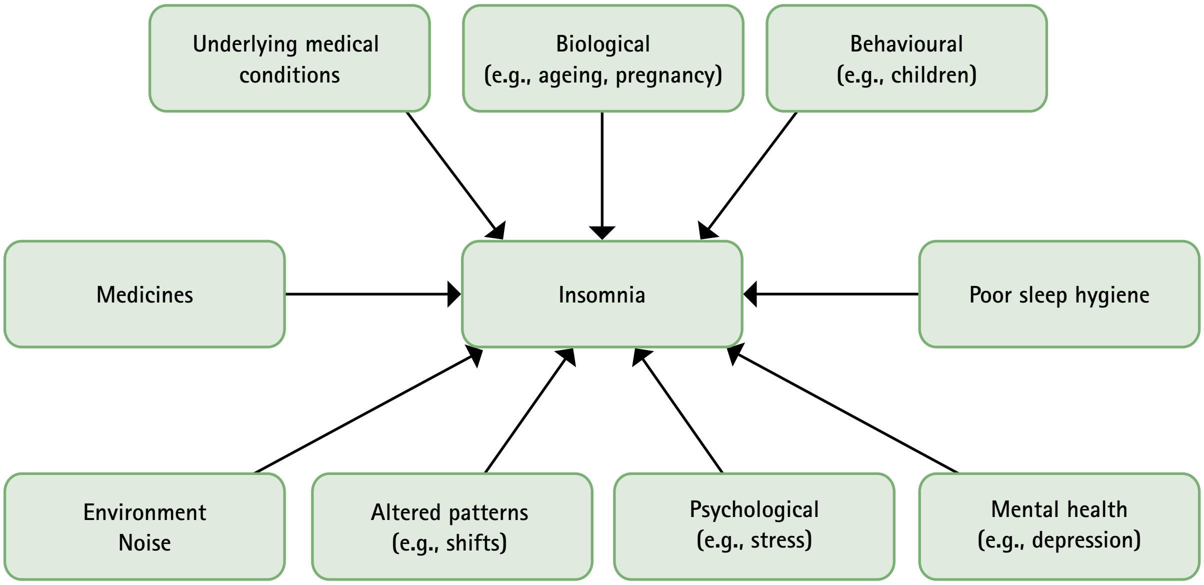
Underlying medical conditions
Biological (e.g., ageing, pregnancy)
Behavioural (e.g., children)
Medicines
Insomnia
Poor sleep hygiene
Environment Noise
Altered patterns (e.g., shifts)
Psychological (e.g., stress)
Mental health (e.g., depression)

Fig. 6.3 Causes of insomnia.

determine the degree of alertness during wakefulness and depth and quality of sleep. Insomnia may be caused by any factor that increases activity in arousal systems or decreases activity in sleep systems.

Arriving at a differential diagnosis

Stress and changes to routine are the most likely causes of insomnia but can be caused by other conditions (Table 6.6). Taking a sleep history and asking a number of specific questions help to determine the cause of the person's insomnia (Table 6.7). Getting the patient to keep a sleep diary (e.g., including retiring and waking times and time taken to fall asleep) is sometimes beneficial because it allows an objective measure of the person's habits compared with their subjective perceptions.

Table 6.6
Causes of insomnia and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Acute episodes of stress • Circadian rhythm disorders
Likely	• Environment • Medicines • Pre-existing medical conditions
Unlikely	• Parasomnia • Periodic limb movement disorder • Restless legs syndrome • Sleep apnoea
Very unlikely	• Narcolepsy

Most likely causes

Acute episodes of stress

Short-term insomnia is usually related to acute stress such as sitting for exams, bereavement, loss of job, forthcoming marriage or house move.

Circadian rhythm disorders

Risk factors associated with short-term insomnia can be identified and include shift or night work, noise, light during the night, uncomfortably high or low temperatures and travelling to different time zones, which can disturb the sleep–wake cycle.

Medicines

Medication can cause insomnia (Table 6.8). The stimulant effects of caffeine (in chocolate, tea, coffee and cola drinks) should not be underestimated. Drinking four or more cups of coffee can cause insomnia in the average healthy adult. It is advisable to avoid caffeine-containing products 6 hours before bedtime. Abruptly stopping some medications can also lead to insomnia. This is particularly seen with the long-term use of sedative drugs, such as benzodiazepines and tricyclic antidepressants.

Medical conditions

A large number of conditions can disturb sleep because of symptoms such as pruritus, pain, breathing difficulties and excessive sweating (Table 6.9). It is therefore important to establish a medical history from the patient. A key role for the pharmacist in these situations is to attribute symptoms to their medical condition and determine if improvements to prescribing could be made. In some cases, a medical diagnosis may yet to be established. In these

Table 6.7
Specific questions to ask the patient: Insomnia

Question	Relevance
Pattern of sleep	• An emotional disturbance (predominantly anxiety) is commonly associated in patients who find it difficult to fall asleep. • Asking patients to tell you what they are thinking about before they fall asleep and when they awake may give you a clue to the cause of the insomnia. • Patterns that include patients who fall asleep but wake early and cannot fall asleep again or who are then restless are sometimes associated with depression.
Daily routine	• Has there been any change to the work routine, such as changes to shift patterns and additional workload, resulting in longer working hours and greater daytime fatigue? • Too much exercise or intellectual arousal before going to bed can make sleep more difficult.
Recent travel	• Time zone changes affect the person's normal sleep pattern, and it can take a number of days to reestablish normality.
Daytime sleeping	• Older adults might nap throughout the day, which results in less sleep needed in the evening, making patients believe they have insomnia.

Table 6.8
Medication that may cause insomnia

Medication	Comments
Stimulants	Caffeine, theophylline, sympathomimetics amines (e.g., pseudoephedrine), MAOIs, especially in early treatment
Antiepileptics	Carbamazepine, phenytoin
Alcohol	Low to moderate amounts can promote sleep but when taken in excess or over a long period can disturb sleep
Beta blockers	Can cause nightmares, especially propranolol; limit by swapping to a beta blocker that does not readily cross the blood–brain barrier
Selective serotonin reuptake inhibitors	Especially fluoxetine
Calcium channel blockers	Can cause somnolence
Diuretics	Ensure that doses should not be taken after midday to stop the need to urinate at night
Cholinesterase inhibitors	Donepezil (abnormal dreams and nightmares) Galantamine
Alpha-blockers	—

MAOI, Monoamine oxidase inhibitor.

Table 6.9
Medical conditions associated with insomnia

Cardiovascular	Heart failure, arrhythmia, coronary artery disease
Pulmonary	Chronic obstructive pulmonary disease, asthma
Neurologic	Stroke, Parkinson disease, depression, dementia, bedwetting in children
Gastrointestinal	Gastro-oesophageal reflux
Renal	Chronic renal failure
Endocrine	Diabetes, hyperthyroidism
Rheumatologic	Rheumatoid arthritis, osteoarthritis, fibromyalgia
Gynaecologic	Pregnancy, menopause

circumstances, onward referral to a GP should be made. For example, between one-third and two-thirds of patients with chronic insomnia have a recognisable psychiatric illness, most commonly depression.

Unlikely causes

Parasomnia

Parasomnia relates to unusual behaviours that people experience before falling asleep, while asleep or during the arousal period between sleep and wakefulness. It is associated with unnatural movements, behaviours, emotions, perceptions and dreams. In some cases, they are severe or persistent enough to cause significant sleep disruption and distress or injury to the patient or bed partner. Examples are sleepwalking, night terrors and sleep-related hallucinations.

Periodic limb movement disorder

Characterised by involuntary movements of the legs, occurring every 20 to 40 seconds, consisting of dorsiflexion of the ankle and flaring of the toes. The leg movements are often accompanied by repetitive, brief arousals from sleep that the patient is often not aware of. The disruption to sleep may result in nonrefreshing sleep and daytime fatigue.

Restless legs syndrome

Restless legs syndrome (RLS) is often confused with periodic limb movement disorder, but the symptoms of RLS occur while the person is still awake, although symptoms are typically worse in the evenings. The person experiences uncomfortable tingling or crawling sensations in the legs accompanied by an uncontrollable urge to move them to feel relief.

Sleep apnoea

Sleep apnoea is associated with a variety of symptoms related to poor sleeping. It should be suspected in individuals who have unrefreshing sleep, excessive day time fatigue and sleepiness. It is also associated with being male or obese.

Very unlikely causes

Narcolepsy

Narcolepsy is characterised by overwhelming daytime drowsiness and sudden attacks of sleep. People with narcolepsy often find it difficult to stay awake for long periods of time. Symptoms also include disrupted sleep and cataplexy (sudden loss of muscle tone that results in conscious collapse) often in response to intense emotions such as laughter, surprise or anger. Narcolepsy typically presents from the midteens onwards.Fig. 6.4 will help in the differential diagnosis of the different types of insomnia.

Red flags indicative of referral: Insomnia

Reason for referral	Why referring	Timeframe for referral
• Duration >4 weeks • Children	• Likely to be associated with an underlying cause and requires investigation	• As soon as practicable
• Excessive day time fatigue or sleepiness	• Suggests sleep apnoea or narcolepsy	
• Poor sleeping patterns associated with unusual behaviours or limb movements	• Suggests parasomnia, restless leg syndrome or periodic limb movement disorder	

Evidence base for over-the-counter medication

Most cases of short-term insomnia should be managed initially by nonpharmacologic measures. If these fail to rectify the problem, then OTC short-term use of sedating antihistamines may be tried, and those with prescribing rights could give 'z' drugs, again, for the short term.

Sleep hygiene

Educating patients about behaviour and practices which affect sleep should be tackled (Table 6.10).

Medication

The sedating antihistamines diphenhydramine and promethazine are the mainstays of OTC treatment.

Diphenhydramine

A number of studies support the clinical effectiveness of diphenhydramine as a sleep aid. At doses of 50 mg, diphenhydramine has been shown to be consistently superior to placebo in inducing sleep

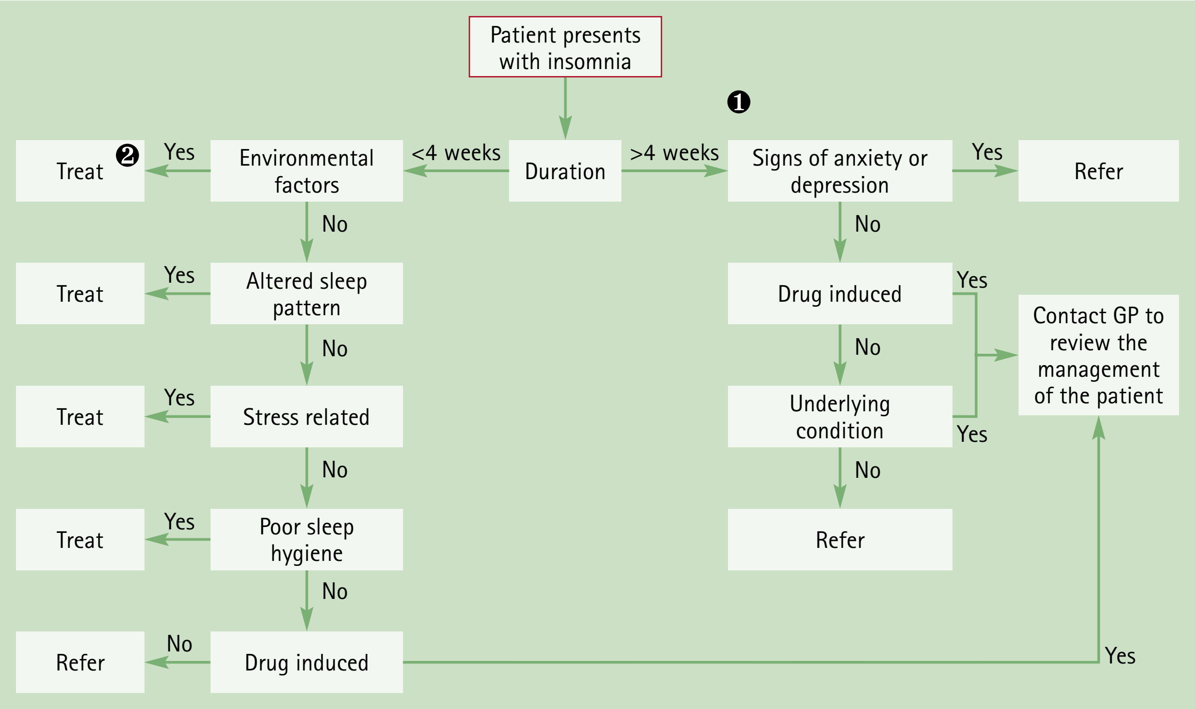
Patient presents with insomnia
❶
Duration
<4 weeks
>4 weeks
Environmental factors
Yes
❷
Treat
No
Altered sleep pattern
Yes
Treat
No
Stress related
Yes
Treat
No
Poor sleep hygiene
Yes
Treat
No
Drug induced
No
Refer
Yes
Signs of anxiety or depression
Yes
Refer
No
Drug induced
Yes
No
Underlying condition
Yes
Contact GP to review the management of the patient
No
Refer

Fig. 6.4 Primer for differential diagnosis of insomnia.

❶ Cases of insomnia lasting longer than 4 weeks should not be treated with over-the-counter medication.

❷ In the first instance, strategies to manage the patient's insomnia should be suggested rather than issuing medication. If medicines are used, patients should not take antihistamines for more than 7 to 10 continuous days because tolerance to their effect can develop. *GP,* General practitioner.

Table 6.10
Key steps to good sleep hygiene

- Maintain a routine, with a regular bedtime and awakening time.
- Maintain a comfortable sleeping environment (e.g., not too warm or cold).
- Food snacks and alcoholic- and caffeine-containing drinks should be avoided.
- Avoid stimulants and alcohol within 6 hours of going to bed.
- Avoid exercise within 4 hours of bedtime.
- Do not take daytime naps.
- Do not sleep in to catch up on sleep.
- Do not do strenuous mental activity at bedtime (e.g., doing a crossword in bed).
- Solve problems before retiring.
- Associate bed with sleep; try not to watch TV or listen to music.
- If unable to get to sleep, get up and do something and return to bed when sleepy.

and as effective as 60 mg of sodium pentobarbital (Rickels et al., 1983; Teutsch et al., 1975) and 15 mg of temazepam (Meuleman et al., 1987). Doses higher than 50 mg of diphenhydramine do not produce a statistically superior clinical effect, and nighttime doses should therefore not exceed this amount. It appears to be most effective at shortening sleep onset time.

Promethazine

Promethazine is widely accepted to cause sedation when used for its licensed indications; however, few trials have investigated its use as a hypnotic. A study by Adam and Oswald (1986) recruited 12 healthy volunteers who took placebo or promethazine, 20 or 40 mg, in a blinded trial. The authors concluded that both doses of promethazine increased the length of sleep, and sleep disturbances were reduced compared with placebo. However, it was not clear if this reached statistical significance. Another small study comparing diazepam 5 mg and promethazine 25 mg in older patients found both to be effective (Viukari & Miettinen, 1984).

Summary

Of the two sedating antihistamines, diphenhydramine has the stronger evidence base to substantiate its use as a hypnotic. It therefore seems prudent to use this as the treatment of choice. However, antihistamines are less effective than gamma-aminobutyric acid A receptor hypnotics (e.g., ‘z’ drugs).

Complementary therapies

Herbal remedies containing hops, German chamomile, skullcap, wild lettuce, lavender, passiflora and valerian are available. However, there is little evidence to support their use. Most information available in the literature relates to the hypothesised actions of chemical constituents or studies in animals. Valerian appears to be the only product in which more than one trial has been conducted on humans. A recent systematic review (Shinjyo et al., 2020) included 10 studies (n = 1065) assessing sleep quality. Conclusions were guarded because of inconsistency of trials relating to the variable quality of herbal extracts used, but they stated that valerian could be a safe and effective herb to promote sleep.

A number of branded products (e.g., Kalms range, Nytol herbal tablets, NiteHerb) containing combinations of herbal ingredients are available OTC.

Melatonin

Melatonin is advocated for sleep disturbance, particularly associated with jet lag. A Cochrane review (Herxheimer & Petrie, 2002) found melatonin to be effective in reducing jet lag when crossing five or more time zones. The timing of the dose is critical. It has to be taken close to the target bedtime at destination. Doses between 0.5 mg and 5.0 mg appear equally effective.

Practical prescribing and product selection

Prescribing information relating to medicines for insomnia is discussed and summarised in Table 6.11, and useful tips relating to patients presenting with insomnia are given in ‘Hints and tips’ in Box 6.2.

Table 6.11
Practical prescribing: Summary of medicines for insomnia

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Diphenhydramine	Older than 16 years	Dry mouth, sedation and grogginess the next day	Increased sedation with alcohol, opioid analgesics, anxiolytics, hypnotics and antidepressants	Glaucoma, prostate enlargement	Pregnancy: some manufacturers advise avoidance In breastfeeding, occasional use OK but discontinue if baby becomes drowsy
Promethazine					

HINTS AND TIPS BOX 6.2: NAUSEA AND VOMITING

Vomiting in infants	• This needs to be differentiated from regurgitation. Regurgitation is an effortless backflow of small amounts of liquid and food between meals or at feeding times; vomiting is the forceful expulsion of gastric contents.

Antihistamines used for insomnia are first-generation antihistamines and interact with other sedating medication, resulting in potentiation of sedation. Additionally, they possess antimuscarinic side effects, which commonly lead to dry mouth and possibly to constipation. These antimuscarinic properties mean that patients with glaucoma and prostate enlargement should ideally avoid their use because they could lead to increased intraocular pressure and precipitation of urinary retention. They should only be given to people older than 16 years of age.

Diphenhydramine (Nytol range)

The dose is 50 mg taken 20 minutes before going to bed.

Promethazine

Proprietary brands of promethazine available to the public include Sominex (20 mg) and Phenergan (10 or 25 mg). The dose for Sominex is one tablet 1 hour before bedtime, and for Phenergan, the dose is up to 50 mg.

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The Sleep Charity. https://thesleepcharity.org.uk

Nausea and vomiting

Background

Nausea is an unpleasant sensation, which may be a precursor to the forceful expulsion of gastric contents (vomiting). Chronic symptoms are defined as those lasting more than 1 month, and should be assessed by a medical practitioner. Therefore, this section deals only with acute causes.

Prevalence and epidemiology

Nausea and vomiting are extremely common symptoms and caused by numerous conditions. As such, their prevalence and epidemiology are dictated by the underlying condition causing the symptoms.

Aetiology

Two main mechanisms are involved in inducing nausea and vomiting—neurologic and peripheral. Nausea occurs because activity in the vomiting centre (located in the medulla oblongata) increases. Information received from the receptor cells in the walls of the gastrointestinal (GI) tract and parts of the nervous system reach a *threshold value* that induces the vomiting reflex. Additionally, further input is received at the vomiting centre from an area known as the chemoreceptor trigger zone. This is highly sensitive to certain circulating chemicals (e.g., substances released by damaged tissues as a result of bacterial infection).

Arriving at a differential diagnosis

Nausea and vomiting are common symptoms of many disorders, including infection, acute alcohol ingestion, anxiety, severe pain and labyrinth and cardiovascular causes. Symptoms rarely occur in isolation, and other symptoms are usually present to help aid in the differential diagnosis. Most cases have a GI origin, with viral gastroenteritis and food poisoning being the most common acute cause in all age groups, but other conditions also need to be considered (Table 6.12). Questioning the patient about associated symptoms should be made to eliminate other conditions (Table 6.13).

Clinical features associated with gastroenteritis

Gastroenteritis is characterised by acute onset, vomiting or diarrhoea and systemic illness (e.g., fever). Most cases, regardless of the infecting pathogen, resolve in a few days and rarely last more than 10 days. In children younger than 5 years old, more than 60% of cases are viral in origin, with rotavirus and small, round, structured viruses most often identified. Vomiting usually precedes diarrhoea by several hours. Bacterial gastroenteritis presents with similar symptoms, although fever is usually a more prominent feature. In food poisoning, violent vomiting and diarrhoea within 24 hours of eating contaminated food are usual.

Table 6.12
Causes of acute nausea and vomiting and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Gastroenteritis
Likely	• Excess alcohol • Gastritis • Medicines • Migraine • Pregnancy
Unlikely	• Gastrointestinal abdominal pain disorders • Inner ear problems
Very unlikely	• Pyloric stenosis

Conditions to eliminate

Likely causes

Excess alcohol consumption

The patient should always be asked about recent alcohol intake because excess quantities are associated with nausea and early morning vomiting.

Gastritis

Gastritis is often alcohol or medicine induced and can present as acute or chronic nausea and vomiting. Epigastric pain is usually present. For further information on gastritis, see the dyspepsia section in Chapter 8.

Medicine induced

Many medications can cause nausea and vomiting. Frequently implicated medicines are cytotoxics, opiates, iron, antibiotics, nonsteroidal antiinflammatory drugs, potassium supplements, selective serotonin reuptake inhibitors, nicotine gum (ingestion of nicotine rather than buccal absorption), theophylline, metformin, anticonvulsants and digoxin toxicity. If medication is suspected, then the prescriber should be contacted to discuss alternative treatment options.

Migraine

Vomiting and especially nausea are common symptoms in patients with migraines.

Pregnancy

Pregnancy should always be considered in females of childbearing age if nausea and vomiting occur in the absence of other symptoms.

Table 6.13
Specific questions to ask the patient: Nausea and vomiting

Question	Relevance
Presence of abdominal pain	• It is common in gastroenteritis but tends not to be severe. • Moderate to severe pain is seen in organic causes. The severity of the pain can lead to nausea and vomiting.
Location of abdominal pain	• Gastroenteritis tends to show diffuse pain. • Right upper quadrant suggests biliary tract disease or cholecystitis. • Epigastric pain suggests pancreatic disease or peptic ulcer disease.
Timing of nausea and vomiting	• Early morning vomiting is often associated with pregnancy or excess alcohol intake. • If vomiting occurs immediately after food, this suggests gastritis; if vomiting begins 1 or more hours after eating, peptic ulcers are possible.
Infective cause	• Diagnosis is supported by the presence of diarrhoea, abdominal pain, fever or malaise.

Sickness affects more than 50% of females, tends to be worse in the early morning and peaks at 9 weeks' gestation.

Unlikely causes

Conditions that affect the inner ear

Labyrinthitis, Ménière disease and vestibular neuronitis can cause nausea and vomiting. For further information on these conditions, please see the section on dizziness and vertigo in Chapter 5.

Gastrointestinal-origin conditions

A number of painful GI conditions can produce nausea and vomiting as part of the overall clinical picture. These include pancreatitis, cholecystitis, appendicitis, small bowel obstruction, hepatitis and peptic ulcer disease. Enquiry into the location, severity and timing of the pain should indicate the cause. For further information on their differentiation, please see the section on abdominal pain in Chapter 8.

Very unlikely causes

Pyloric stenosis

Symptoms of pyloric stenosis usually appear within 3 to 5 weeks after birth and are rare after 3 months of age. The baby may vomit forcefully (projectile). Vomiting might be mild at first but become more severe over time.

Red flags indicative of referral: Nausea and vomiting

Reason for referral	Why referring	Timeframe for referral
Vertigo or dizziness	Suggests an inner ear problem	As soon as practicable
Vomiting in children younger than 1 year of age lasting >24 hours	Risk of dehydration	Same-day GP referral
Moderate to severe abdominal pain	Suggests an organic GI cause	

Product selection

Only prochlorperazine is available OTC to use to combat nausea and vomiting. For dosing and counselling on prochlorperazine, please refer to the section on migraine in this chapter. If dehydration is suspected, the patient should replace fluids. Oral rehydration solutions should be offered.

Further Reading

Scorza, K., Willaims, A., Phillips, D. J. D., & Shaw, J. (2007). Evaluation of nausea and vomiting. *American Family Physician, 76*, 76–84.

Motion sickness

Background

Motion sickness is a symptom complex that is characterised by nausea, pallor, vague abdominal discomfort and occasionally vomiting. Symptoms of fatigue, weakness and an inability to concentrate can also be experienced. Symptoms tend to resolve over prolonged exposure to motion. For example, sea sickness disappears over time, a characteristic called adaptation or habituation. Motion sickness can affect any individual and involve any form of movement, from moving vehicles to fairground rides.

Prevalence and epidemiology

The exact prevalence of motion sickness is unknown. Children between the ages of 2 and 12 years are most often affected, and it tends to affect females more than males. However, certain sectors of the population understandably show higher prevalence rates (e.g., naval crew and pilots).

Aetiology

It is widely believed that motion sickness results from an inability of the brain to process conflicting information received from sensory nerve terminals concerning movement and position, the sensory conflict hypothesis. Motion sickness occurs when motion is expected but not experienced or the pattern of motion differs from that previously experienced.

Evidence base for over-the-counter medication

First-generation antihistamines (cyclizine, cinnarizine and promethazine) and the anticholinergic hyoscine (also called scopolamine) are routinely recommended to prevent motion sickness. All have shown various degrees of effectiveness. A Cochrane review (14 studies, n = 1025) found scopolamine to be superior to placebo and metoclopramide and as good as antihistamines (Spinks & Wasiak, 2011).

Ginger has long been advocated for use as an antiemetic. A review by Chrubasik et al. (2005) identified four studies with ginger in the prevention of motion sickness. The results suggested ginger was better than placebo and similar in efficacy to other pharmacologic agents. However, the studies involved small numbers of patients and were of uncertain quality; the authors of the review concluded that further studies are required to confirm the effectiveness of ginger.

Nonpharmacologic approaches to prevent motion sickness are also available. Bruce et al. (1990) investigated the use of Sea Band acupressure bands versus hyoscine and placebo. Eighteen healthy volunteers were subjected to simulated conditions to induce motion sickness. The findings showed that although hyoscine exerted a preventive effect, Sea Bands were no more effective than placebo. Further trials have confirmed these findings, although one small trial by Stern et al. (2001) reported positive findings. Accurate

Table 6.14
Practical prescribing: Summary of medicines for travel sickness

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in which care is exercised	Pregnancy and breastfeeding
Cyclizine	Older than 6 years	Dry mouth, sedation	Increased sedation with alcohol, opioid analgesics, anxiolytics, hypnotics and antidepressants	Angle-closure glaucoma, prostate enlargement	Standard references state OK, although some manufacturers advise avoidance
Cinnarizine (Stugeron 15)	Older than 5 years				
Promethazine (Avomine)	Older than 5 years				
Hyoscine			Increased anticholinergic side effects with TCAs and neuroleptics	Angle-closure glaucoma, prostate enlargement	Avoid, if possible, in pregnancy In breastfeeding, may cause drowsiness, which would lead to poor feeding in long-term use but OK for short journeys
Joy-Rides	Older than 3 years				
Kwells	Older than 10 years				
Kwells Kids	Older than 4 years				

TCA, Tricyclic antidepressant.

placement of the pressure bands may be important because acupressure has shown positive effects for nausea and vomiting associated with pregnancy. However, another study examining two different acupressure bands (Refieband and Acuband) found no evidence of efficacy in reducing the development of motion sickness compared with placebo, irrespective of whether the bands were used appropriately or not (Miller & Muth, 2005).

Summary

Current evidence indicates that hyoscine and first-generation antihistamines are effective. The choice among the various agents is driven by patient acceptability.

Practical prescribing and product selection

Prescribing information relating to medicines for motion sickness reviewed in the section 'Evidence base for over-the-counter medication' is discussed and summarised in Table 6.14. They are most effective when given before experiencing motion sickness, and products should be selected based on matching the length of the journey with the duration of action of each medicine (see 'Hints and tips' in Box 6.3).

Antihistamines

Antihistamines promoted for use in motion sickness are first-generation H_1 antagonists and are associated with sedation. They have the same side effects, interactions and precautions in use.

HINTS AND TIPS BOX 6.3: TRAVEL SICKNESS

How to minimise effects of motion	• Planes: Sit over the wing. • Ships: Sit in the middle, close to the water line. • Cars: Sit in the front. • Avoid rear-facing seats in all forms of transport. • Focus on stationary objects. • Avoid alcohol or overeating before journeys. • Avoid reading or focusing on games. • Ensure good ventilation (e.g., open a window).
Dry mouth problems	• Many people complain of a dry mouth with travel sickness medicines. This is easily overcome by sucking on a sweet, which will stimulate saliva production.
Matching up the length of journey with the product	• Hyoscine should be recommended for journeys up to 4 hours, cinnarizine for journeys over 4 hours but less than 8 hours and promethazine for journeys longer than 8 hours.

Cyclizine

Cyclizine is now rarely used because it is subject to abuse; consequently, many pharmacies do not stock it. If taken, adults and children older than the age of 12 years should take one tablet (50 mg) three times a day. The dose for children older than the age of 6 years is half the adult dose.

Cinnarizine (Stugeron 15)

Adults and children older than the age of 12 should take two tablets (30 mg) 2 hours before travel. The dose can be repeated every 8 hours (1 tablet) if needed. For children aged between 5 and 12 years, the dose is half (15 mg) the adult dose.

Promethazine (Avomine)

Avomine can be given for both prevention and treatment of travel sickness. For prevention, adults, and children older than the age of 10 years should take one tablet (25 mg) at least 1 or 2 hours before travel. For treatment, one tablet should be taken as soon as sickness is felt followed by a second tablet 6 to 8 hours later. For children older than the age of 5 years, the dose should be half that of the adult dose in both prevention and treatment.

Hyoscine (e.g., Joy-Rides and Kwells)

Products should be taken 20 to 30 minutes before the time of travel. They have a short half-life and therefore have a short duration of action, and the dose might need have to be repeated on journeys longer than 4 hours. Anticholinergic side effects are more obvious than with antihistamines, and it does interact with other medicines that have anticholinergic side effects. Because it crosses the blood–brain barrier, it may cause sedation. It appears to be safe in pregnancy, although manufacturers state it should be avoided.

Joy-Rides

Joy-Rides can be given from age 3 years upwards. Children between 3 and 4 years should take half a tablet (75 µg) and no more than one tablet (150 µg) in 24 hours. Children between the age of 4 and 7 years should take one tablet (150 µg) with a maximum of two tablets (300 µg) in 24 hours, and children aged between 7 and 12 years should take one to two tablets.

Kwells

Kwells (hyoscine 3000 µg) can only be given to children aged 10 years and older. Children older than the age of 10 years should take half to one tablet. For adults, the dose is one tablet.

Kwells Kids

Kwells Kids contain half the amount of hyoscine (150 µg) than Kwells and are marketed at children younger than the age of 10 years. Children aged between 4 and 10 years should take half to one tablet.

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Self-assessment questions

The following questions are intended to supplement the text. Two levels of questions are provided, multiple-choice questions and case studies. The multiple-choice questions are designed to test knowledge and application of knowledge; the case studies allow this knowledge to be put in context in patient scenarios.

Multiple-choice questions

6.1. A 32-year-old female presents to the pharmacy one Monday afternoon complaining of a headache. Based on epidemiology alone, which ONE of the following would be the most likely cause of the headache?

a. Migraine
b. Eye strain
c. Tension-type headache
d. Sinusitis
e. Cluster headache

6.2. A 41-year-old male wants some advice about his headache. He reveals that the pain is towards the front of his head. Knowing this information, which ONE of the following conditions can be ruled out based on location?

a. Migraine
b. Giant cell arteritis
c. Subarachnoid haemorrhage
d. Sinusitis
e. Cluster headache

6.3. When considering the diagnosis of headache, symptoms can suggest conditions outside the remit of community pharmacy practice. From the list of symptoms below, which ONE of the following indicates urgent referral?

a. Flashing or flickering lights
b. Short-lived pins and needles in the arm followed by headache
c. Scalp tenderness and frontal headache
d. Symptoms that improve as the day progresses
e. Symptoms that last longer than 5 days

6.4. From the following descriptions, which ONE of the following best describes the headache symptoms of migraine?

a. Pain that is unilateral and lancing
b. Pain that is unilateral, orbital and boring
c. Pain that is unilateral, frontal and dull
d. Pain that is unilateral and temporal
e. Pain that is unilateral and throbbing

6.5. A 41-year-old male wants some advice about his headache. He tells you that he has had the symptoms for a couple of days. The headache is at the front of his head, and it feels like a dull throb. Which ONE of the following questions would be most discriminatory in assessing if it were a migraine or tension-type headache?

a. How severe is the pain?
b. What medicines does the patient take?
c. What medicines has the patient tried to ease the pain?
d. Where is the pain?
e. Does the patient feel sick?

6.6. Which ONE of the following signs or symptoms warrants referral?

a. Headache lasting 7 to 10 days
b. Headache described as vicelike
c. Headache associated with the workplace environment
d. Headache in children younger than 12 years, with no sign of infection
e. Headache associated with cough and cold symptoms

6.7. Chronic insomnia is associated with which ONE of the following?

a. Change in work shift patterns
b. Acute stressful situations
c. Foreign travel
d. Excessive caffeine intake
e. None of the above

6.8. Which ONE of the following complementary therapy or medicine has the most evidence to support its use in treating people with insomnia?

a. Acupuncture
b. Lavender
c. Chamomile
d. Valerian
e. Reflexology

6.9. Many medicines can induce nausea or vomiting. From the list below, which ONE of the following medicines is most likely to have this effect?

a. Paracetamol
b. Diphenhydramine
c. Omeprazole
d. Sumatriptan
e. Thyroxine

6.10. Which ONE of the following predisposing factors is most associated with developing migraine?

- **a.** Early-onset menarche
- **b.** Family members who have migraines
- **c.** High blood pressure
- **d.** Obesity
- **e.** Smoking

6.11. Nausea and vomiting are most associated with which ONE of the following conditions?

- **a.** Cluster headache
- **b.** Sinusitis
- **c.** Subarachnoid haemorrhage
- **d.** Tension-type headache
- **e.** Trigeminal neuralgia

6.12. From the list of conditions known to cause nausea or vomiting, which ONE of the following is most associated with additional symptoms of diarrhoea?

- **a.** Cholecystitis
- **b.** Migraine
- **c.** Gastritis
- **d.** Gastroenteritis
- **e.** Otitis media

6.13. A 31-year-old female wants some advice about her headache. She tells you that the pain is at the front, mainly on the left side, and dull in nature. Knowing this information, which ONE of the following is most likely?

- **a.** Cluster headache
- **b.** Giant cell arteritis
- **c.** Migraine
- **d.** Sinusitis
- **e.** Subarachnoid haemorrhage

6.14. Mrs Jones, a 31-year-old female, presents to the pharmacy complaining of headaches. She tells you that the pain has been present for the last 24 hours and is at the front of her head, and she has felt a little sick. Based on this information, which ONE of the following would be the most likely diagnosis?

- **a.** Carbon monoxide poisoning
- **b.** Giant cell arteritis
- **c.** Glaucoma
- **d.** Haematoma
- **e.** Migraine

6.15. Nausea and vomiting in children younger than 1 year of age is common. Which ONE of the following conditions is nausea and vomiting most seen in this age group?

- **a.** Otitis media
- **b.** Ménière disease
- **c.** Urinary tract infection
- **d.** Upper respiratory tract infection
- **e.** Feeding difficulties

Questions 6.16 to 6.25 concern the following conditions:

A. Sinusitis
B. Cluster headache
C. Migraine
D. Giant cell arteritis
E. Meningitis
F. Tension-type headache
G. Subarachnoid haemorrhage
H. Medication overuse headache
I. Glaucoma

Select, from A to I, which statement is most closely associated with the above conditions:

6.16. Is more common in males

6.17. Is seen with advancing age but shows no gender bias

6.18. Onset tends to be in early adulthood

6.19. Is more common in females

6.20. Is frequently seen in older females

6.21. Is secondary to infection?

6.22. Is most frequently seen in young children

6.23. Is the most prevalent headache condition

6.24. Is associated with nasal congestion and severe headache

6.25. Pain is occipital

Answers

6.1. Answer: c

Rationale: Tension-type headaches (c) are most prevalent in all age groups. Migraine (a) is more common in females. Eye strain (b) and sinusitis (d), although common causes of headache, are far less prevalent than tension-type headache. Cluster headache (e) is unusual and more common in males than in females.

6.2. Answer: c

Rationale: Migraine (a), giant cell arteritis (b), sinusitis (d) and cluster headache (e) are frontal-occurring headaches.

6.3. Answer: c

Rationale: a and b are symptoms associated with migraine, and d and e suggest tension-type headache because headaches can last days, and symptoms often improve as the day goes on. Symptoms of scalp tenderness (c) are suggestive of giant cell arteritis, and any suspicion that this is the cause requires urgent referral.

6.4. Answer: e

Rationale: Migraine is usually unilateral, but this is stated for all options, so it is unhelpful. Therefore, the nature of the pain helps to differentiate causes. Lancing (a) could be trigeminal neuralgia, orbital and boring (b) indicates cluster headache, frontal and dull suggests sinusitis (c) and a temporal location suggests giant cell arteritis (d). This leaves unilateral and throbbing as the best descriptors for migraine (e).

6.5. Answer: e

Rationale: Nausea is experienced by about 90% of people with migraine and is rarely associated with tension headache; it is therefore the most discriminatory in this case. Location (d) is also a good question to ask because approximately 70% of patients with migraine have one-sided pain, whereas tension-type headache is usually bilateral. Severity (a) is subjective, and although useful, needs to be quantified by using some form of scale. Asking about medicines (b and c) taken or tried will not be of particular help.

6.6. Answer: d

Rationale: Duration of 7 to 10 days (a) is not unusual, especially tension-type headache; a vice-like description (b) suggests tension headache also. If workplace implicated (c), the cause needs exploring but does not warrant referral. Headaches associated with upper respiratory tract infections (e) are commonly seen. However, headaches in children in the absence of infection (d) are unusual and need further assessment.

6.7. Answer: e

Rationale: Options a to d all suggest short-term causes.

6.8. Answer: d

Rationale: Based on evidence from sources such as Cochrane reviews, only valerian (d) has evidence of efficacy.

6.9. *Answer: c*

Rationale: Data from summary of medicine characteristics show that paracetamol (a), diphenhydramine (b) and thyroxine (e) do not list nausea or vomiting as a side effect. Omeprazole (c) is listed as common. For sumatriptan (d), although this is listed as a side effect, it remains unclear if this is related to sumatriptan or the underlying condition.

6.10. *Answer: b*

Rationale: All have been linked with developing migraine, but the strongest evidence is a genetic link (b).

6.11. Answer: e

Rationale: Cluster headache (a), sinusitis (b), tension-type headache (d) and trigeminal neuralgia (e) are not associated with nausea or vomiting.

6.12. Answer: d

Rationale: Cholecystitis (a), migraine (b) and otitis media (e) are associated with pain and gastritis (c) with abdominal discomfort. None routinely has diarrhoea as a symptom except gastroenteritis (d).

6.13. Answer: d

Rationale: All but subarachnoid haemorrhage (e) present toward the front. Cluster headache (a) tends to severe and boring, giant cell arteritis (b) is also severe and near the temples and migraine tends to be throbbing rather than dull. Sinusitis, especially in the early stages, shows dull localised pain.

6.14. Answer: e

Rationale: All but b are associated with nausea. Carbon monoxide poisoning (a) tends to have diffuse headache, and haematoma (d) headache is generally occipital. Glaucoma (c) and migraine (e) both cause frontal headache, but glaucoma is associated with older people.

6.15. Answer: c

Rationale: Ménière disease (b) is not associated with this age group, and nausea and vomiting are unusual in upper respiratory tract infection (d). Feeding difficulties (e) are commonly associated with food regurgitation rather than with nausea and vomiting. Otitis media (a) does occur in this age group, but nausea and vomiting are not common.

6.16. Answer: b

Rationale: Epidemiologic data clearly shows that cluster headache (b) is much more common in males than females.

6.17. Answer: i

Rationale: Giant cell arteritis (d) and glaucoma (i) are the only two conditions listed that are strongly associated with advancing age. However, giant cell arteritis is more common in females.

6.18. Answer: c

Rationale: Options d and i can be eliminated (see answer to 6.17); cluster headache (b) and tension-type headache (f) are associated with onset in adulthood. Sinusitis (a) is a complication of colds and shows no real pattern with regard to age of onset, as is the case with medication-overuse headache (h), and meningitis (e) is seen in young children. Migraine (c), however, does often start in adolescence.

6.19. Answer: c

Rationale: Epidemiologic data show migraine (c) to be more common in females than males.

6.20. Answer: d

Rationale: See answer to 6.17.

6.21. Answer: a

Rationale: Sinusitis (a) is a complication of an upper respiratory tract infection

6.22. Answer: e

Rationale: See answer to 6.18.

6.23. Answer: f

Rationale: Most listed conditions are uncommon or rarely seen in primary care. Only migraine (a) and tension-type headache (f) are regularly encountered. Of the two, tension-type headache is the most prevalent.

6.24. Answer: b

Rationale: Accompanying symptoms with headache are useful in helping with a differential diagnosis. Nasal congestion associated with headache is not common, and the only conditions listed in which this would be seen are sinusitis (a) and cluster headache (b). The pain is described as severe, so this indicates cluster headache as being the most likely diagnosis.

6.25. Answer: g

Rationale: Sinusitis (a), cluster headache (b), migraine (c), temporal arteritis (d) and glaucoma (i) are associated with frontal headache. Meningitis (e), tension-type headache (f) and medication overuse headache (h) are more generalised in nature.

Case studies

CASE STUDY 6.1

Mr AM, an Afro-Caribbean male in his early 30s, asks for your advice about a headache that he describes as being all over, which he has had for the last week. He is generally fit and healthy and takes no medicines from the doctor and rarely buys anything from the pharmacy.

a. Based on this scenario, how would you frame the problem representation?

b. From this problem representation, what would be your hypotheses as to the likely causes of his headache?

c. What further questions should you ask and why?

You find out the following information:

- *Seems to get worse as day goes on*
- *Pain pretty much constant*
- *Pain score of 4 of 10*
- *No sickness or problems with light*
- *Had an eye test 1 year ago*
- *No recent changes to work or home life*

d. Based on the information you currently have, what is your differential diagnosis?

e. Given your differential diagnosis in point e, outline your management and safety netting strategy.

Answers

a. *An adult Afro-Caribbean male presents with 1 week's history of generalised headache*

b. *Tension-type headache, eye strain*

c. *Severity and nature of pain; associated symptoms; social history*

d. *Tension-type headache*

e. *Simple analgesia and review in 5 to 7 days in symptoms persist*

CASE STUDY 6.2

Mrs PC, a 36-year-old female, asks you for something to treat her headache. On questioning, you find out the following:

- *She has had the headache for about 5 days.*
- *Pain is located behind left eye and at the front of head but also at the back of head.*
- *Mrs PC is experiencing aching pain that worsens as the day progresses,*
- *She has no sickness or visual disturbances.*
- *She has not had this type of headache before.*
- *Work is now busy because of a conference she is organising.*
- *She has tried paracetamol, which helps for a while, but the pain comes back after a few hours.*
- *She takes nothing from her GP except the minipill.*
- *There is no recent history of head trauma.*

a. From the information known, what conclusions can you draw as to the possible cause of her headache?

- ***Age** (36 years): Most likely causes are tension-type and migraine headaches based on age.*
- ***Sex** (female): Females experience more migraines than males and fewer cluster headaches; therefore, migraine is a possibility.*
- ***Duration** (5 days): Most migraines do not last beyond 72 hours. Cluster headache duration is generally only a few hours. It seems tension-type headache fits better given duration.*
- ***Location** (behind eye and back of head): The pain seems fairly generalised, which is indicative of tension-type headache.*
- ***Nature of pain** (ache): Again, tension-type headaches are often described as nonthrobbing. Pain does not appear to be severe, which means migraine and cluster headache, as well as sinister causes are less likely. Pain seems to worsen as the day progresses, which fits with tension-type headache.*
- ***Associated symptoms** (none): No nausea or vomiting. This tends to exclude migraine and conditions causing raised intracranial pressure.*
- ***New headache** (yes): The patient has not had this type of headache before, a fact that might be suggestive of a more serious cause of headache.*
- ***Lifestyle** (work is busy): Stress is a contributing factor of tension-type headache. It appears the patient has more stress than normal, which could be a cause of the headache.*
- ***Medication** (paracetamol): This appears to work but does not really help in establishing the cause of the headache.*
- ***Medication from GP** (minipill): Unlikely to cause the headache, but further questions should be asked of the patient about how long she has been taking the medication. Most Adverse Drug Reactions normally coincide with new medication or an alteration to the dosage regimen.*
- ***Recent trauma** (none): This tends to exclude headache caused by space-occupying lesions. It is worth remembering that symptoms manifest themselves when pressure is exerted on adjacent structures to a haematoma, tumour or abscess. It might therefore take longer than several weeks for the patient to notice symptoms. As a result, always ask about trauma over the past 6 to 12 weeks.*

CASE STUDY 6.3

Mr FD, A 67-year-old male, asks you for a strong painkiller for his headache. He has had the headache for a few days, but it does not seem to be going away. After talking with him, you find out the headache is located in the frontal area and is unilateral.

a. Based on this information, which conditions could be ruled out from your initial thinking?

Conditions that present with headache located toward the back of the head such as neck pain and cervical spondylosis or subarachnoid haemorrhage

He describes the pain as throbbing.

b. Based on this information, which conditions could be ruled out from your thinking now?

Conditions in which pain is described as nonthrobbing include eye strain, neck pain, sinusitis and tension-type headache.

c. At this point, what are your differential diagnoses of a throbbing frontal headache?

Migraine
Giant cell arteritis
Glaucoma
Cluster headache

You ask more questions and find out:

He has never had a headache like this before
He has not had migraines in the past.
There are no symptoms of nausea or vomiting.
He is retired and has a nonstressful lifestyle.
He has tried paracetamol but without much success.
He takes ramipril for hypertension.

d. Given this additional information, what is your differential diagnosis now?

Giant cell arteritis seems most plausible.

e. What extra questions could you ask to support this diagnosis?

Is there tenderness in the temple region or scalp?
Is there any pain on chewing?

CASE STUDY 6.4

The wife of a 54-year-old male enters the pharmacy and asks for sumatriptan; she has seen it advertised in the paper, and her husband seems to have all the symptoms of migraine.

You gain the following information from the person:

- *He has a 12-hour history of a very painful headache that seems to be worst towards the back of the head.*
- *He feels nauseous and vomited twice, but vomiting seems to have subsided.*
- *The pain means that he has not been able to do much, even doing 'normal' things such as taking a shower.*
- *He has not had a headache like this before.*
- *He takes quite a few medicines for 'heart stuff' (cholesterol and high blood pressure), but she cannot remember the names.*

a. Given the information to given you, is her husband a suitable candidate for sumatriptan?

Sumatriptan is not indicated in this instance because it is the first presentation of symptoms, and he has heart disease.

b. If the patient were suitable for sumatriptan, given his symptoms, would you sell them to his wife?

No. Symptoms are not fully consistent with migraine. The location and lack of previous history suggest it may not migraine.

c. What are your thoughts as to the cause of his symptoms?

It appears he has a new severe headache in the occipital region and has been sick. These symptoms all point to sinister pathology such as subarachnoid haemorrhage.

d. What course of action would you take?
This is a life-threatening condition and a medical emergency. Urgent referral to hospital is needed.

CASE STUDY 6.5

Mr and Mrs J and their two children, Sammy, aged 5 years, and Jessica, aged 12 years, are going on their summer holidays. They want to know what travel sickness tablets they should take.

a. What information do you need to know before recommending a suitable product?

- ***Who is affected by travel sickness?*** *Is it the children only or the adults as well? This will influence the choice of product(s); for example, if one of the parents is driving, then products that cause drowsiness will best be avoided.*
- ***The length of the trip****: It is sensible to choose a medicine that has the same duration of action as the length of the trip.*
- ***Medication history:*** *Checks should be made about if any of the family take medicines that might preclude them from using OTC travel sickness products or may potentiate their side effects.*
- ***Past medication for similar journeys****: It is likely that the family have had to purchase such products in the past. It is worth finding out what they were and how well tolerated they were.*

You find out they are going to northern France by ferry. This is a 2-hour boat journey followed by a further 2-hour drive. Mr J gets seasick, and neither of the children likes boat or car journeys. Jessica also has narcolepsy.

b. What would be the best drug regimen for the family? State your rationale.

It appears that the total journey time is relatively short, and a hyoscine-based product would be the suitable for the two children and their father. Kwells Kids could be used by everyone; Mr J would have to take two tablets, Jessica one tablet and Sammy half a tablet. Because Jessica has narcolepsy, it is necessary to see if she takes any medication to help with the condition. If she does, then checks would have to be made to ensure that Jessica could still take hyoscine.

c. What practical advice would you also offer the family?

Hyoscine causes dry mouth and potential sedation. Sucking on sweets can alleviate the dry mouth. Mr J should be warned that he may experience drowsiness, and if affected, he may not be able to drive after the ferry crossing. Unfortunately, all travel sickness products can cause drowsiness, so you cannot recommend an alternative.

Chapter 7

Women's health

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Background

Females have unique healthcare needs. Many are outside the remit of community pharmacists and are managed by other healthcare practitioners. However, with greater medicine availability, either as an over-the-counter (OTC) product or through contractual service specifications, some of their healthcare needs can be met.

History taking

It is essential to take an accurate history from the patient; however, the patient might feel uncomfortable or embarrassed about discussing such symptoms, especially in a busy pharmacy. It is important that the patient is made to feel at ease, and using a consultation room can help to provide adequate privacy.

Acute uncomplicated urinary tract infection (cystitis)

Background

Urologic anatomy is composed of the kidneys, ureters, bladder and urethra. The proximity of these to the female reproductive organs means that a female often has more urologic problems than males. In addition, the female urethra is much shorter (~5 cm) compared with the male urethra (~20 cm). This makes it much easier for bacteria to travel to the bladder, leading to infection.

Prevalence and epidemiology

Urinary tract infections (UTIs) are some of most common infections treated in general medical practice, with people aged between 15 and 34 years accounting for most cases; it is estimated that up to 50% of all females will experience at least one episode of cystitis in their lifetimes, a third of whom will have further attacks. Certain factors increase the risk of a UTI, including frequent or recent sexual activity, previous episodes of cystitis, the use of diaphragms or an indwelling catheter, advancing age (e.g., postmenopausal), pregnancy and diabetes. Recurrent cystitis (usually defined as three or more episodes in the past 12 months or two episodes in the past 6 months) is relatively common.

Aetiology

Infection is caused, in most cases, by the patient's own bowel flora that ascends the urethra from the perineal and perianal areas. Bacteria are thus transferred to the bladder, where they proliferate. The most common bacterial organisms implicated in cystitis are *Escherichia coli* (>80% of cases), *Staphylococcus* spp. (≤10% of cases), and *Proteus* spp. However, several studies have shown that up to 50% of females do not have positive urine cultures according to traditional criteria (>10^5 bacteria/mL of urine), although they do have signs and symptoms of infection. These patients with *low-count bacteriuria* are classed as having UTIs.

Table 7.1
Causes of dysuria and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	- Acute uncomplicated cystitis
Likely	- Pyelonephritis - Sexually transmitted disease
Unlikely	- Foreign body - Interstitial cystitis (painful bladder syndrome)
Very unlikely	- Malignancy - Medicine-induced cystitis - Vaginitis

Arriving at a differential diagnosis

Most patients who present in the community pharmacy have acute uncomplicated UTI and often have made a self-diagnosis (Table 7.1). Therefore, the aims of the pharmacist are to confirm a patient's self-diagnosis, rule out upper UTI (pyelonephritis) and identify patients who are at risk of complications. Asking symptom-specific questions helps to establish a differential diagnosis (Table 7.2).

Table 7.2
Specific questions to ask the patient: Uncomplicated urinary tract infection

Question	Relevance
Duration	- Symptoms that have lasted >5–7 days should be viewed with caution because cystitis should resolve within that time. - Recurrent or persistent symptoms can suggest conditions such as interstitial cystitis or malignancy.
Age of the patient	- Cystitis is unusual in children and should be viewed with caution. This might be a sign of a structural urinary tract abnormality. - Young females (~15–35 years of age) are most likely to have cystitis or sexually transmitted disease. - Older female patients (older than 65 years) have a higher rate of complications associated with cystitis and the chance of malignancy increases.
Presence of fever	- Fever is a sensitive indicator of an upper urinary tract infection.
Vaginal discharge	- If a patient reports vaginal discharge, the likely diagnosis is not cystitis.
Location of pain	- Pain experienced in the loin area suggests an upper urinary tract infection.

Clinical features of acute uncomplicated urinary tract infection

Cystitis is characterized by sudden onset discomfort, pain, burning, tingling or stinging when passing urine and is associated with frequency, urgency, nocturia and changes to urine appearance (e.g., cloudy or change in colour). In older females, a typical presentation is often absent, but features of confusion and lethargy are often present.

Haematuria, although common, should be viewed with caution because it might indicate stones or a tumour. Such cases are best referred.

Conditions to eliminate

Likely causes

Pyelonephritis

The most frequent complication of cystitis is when the invading pathogen involves the ureter or kidney by ascending from the bladder to these higher anatomic structures. The triad of flank pain, fever, nausea and vomiting is typically associated with pyelonephritis. The onset is typically sudden. Pain relief can be offered, but a medical referral is needed to confirm the diagnosis.

Sexually transmitted diseases

Sexually transmitted diseases (STDs) can be caused by a number of pathogens, such as *Chlamydia trachomatis* (most common but generally asymptomatic) and *Neisseria gonorrhoea.*

Symptoms are similar to those of acute uncomplicated cystitis in that pain and dysuria are experienced, but symptoms tend to be more gradual in onset and last for a longer period of time. In addition, increased or altered vaginal discharge (usually purulent), lower abdominal pain and pain during sex are common symptoms. A sexual history often reveals a history of unprotected sex, multiple sexual partners or a new sexual partner.

Unlikely causes

Foreign body

Signs of a retained object include dysuria, malodorous coloured discharge, vaginal itching and fever.

Interstitial cystitis (painful bladder syndrome)

Interstitial cystitis is a chronic condition that causes lower abdominal pain, persistent urgency and frequency. The pain ranges from mild discomfort to severe pain. Pain is often worse whilst the bladder fills and is relieved on urination. The condition is a part of a spectrum of diseases known as painful bladder syndrome and is usually a diagnosis of exclusion.

Very unlikely causes

Malignancy

Kidney cancer

If symptoms are present, haematuria is the most common symptom. Other symptoms may be present but are vague and include weight loss, fever, flank pain, tiredness and loss of appetite. It is most common in people older than the age of 60 years.

Bladder cancer

Painless haematuria is the predominant symptom. Less commonly UTI-like symptoms are experienced (e.g., frequency, urgency, burning). It is most common in people after the age of 70 years and rarely seen in people after 40 years of age.

Ovarian cancer

Ovarian cancer is typically seen in older people, especially from 50 years upwards. Symptoms can include persistent or frequent increased urinary urgency or frequency. However, other symptoms such as abdominal bloating, feeling full, loss of appetite (leading to weight loss), pelvic or abdominal pain, abnormal uterine bleeding and irritable bowel disease (IBS)–like symptoms can also be present.

Medicine-induced cystitis

Nonsteroidal antiinflammatory agents (NSAIDs), especially tiaprofenic acid, opioids, nifedipine (dysuria—uncommon), cyclophosphamide (cystitis—very common) and ketamine (rare), have been shown to cause symptoms of cystitis.

Vaginitis

Vaginitis is usually associated with vaginal discharge and pain during sex. It can cause cystitis-like symptoms, although typically it is not associated with urgency or frequency. Postmenopausal females (atrophic vaginitis) experience thinning of the endometrial lining because of a reduction in the levels of circulating oestrogen in the blood. This can also lead to symptoms of vaginal dryness and itching.

Fig. 7.1 will aid in the differentiation of cystitis from other conditions.

Red flags indicative of referral: Cystitis

Reason for referral	Why referring	Timeframe for referral
• Children younger than 16 years	• Cystitis unusual in this age group	• As soon as practicable
• Patients with diabetes or who are immuno compromised	• More likely to develop complications from a urinary tract infection (UTI)	
• Duration >5 days	• Almost all acute uncomplicated UTIs resolve in 5 days	
• Vaginal discharge	• Unusual in cystitis	
• Females older than 65 years	• More susceptible to complicated UTIs and pyelonephritis	
• Pregnancy	• Pressure on the urinary tract caused by an infant makes management of UTIs more difficult and can increase the risk of pyelonephritis	

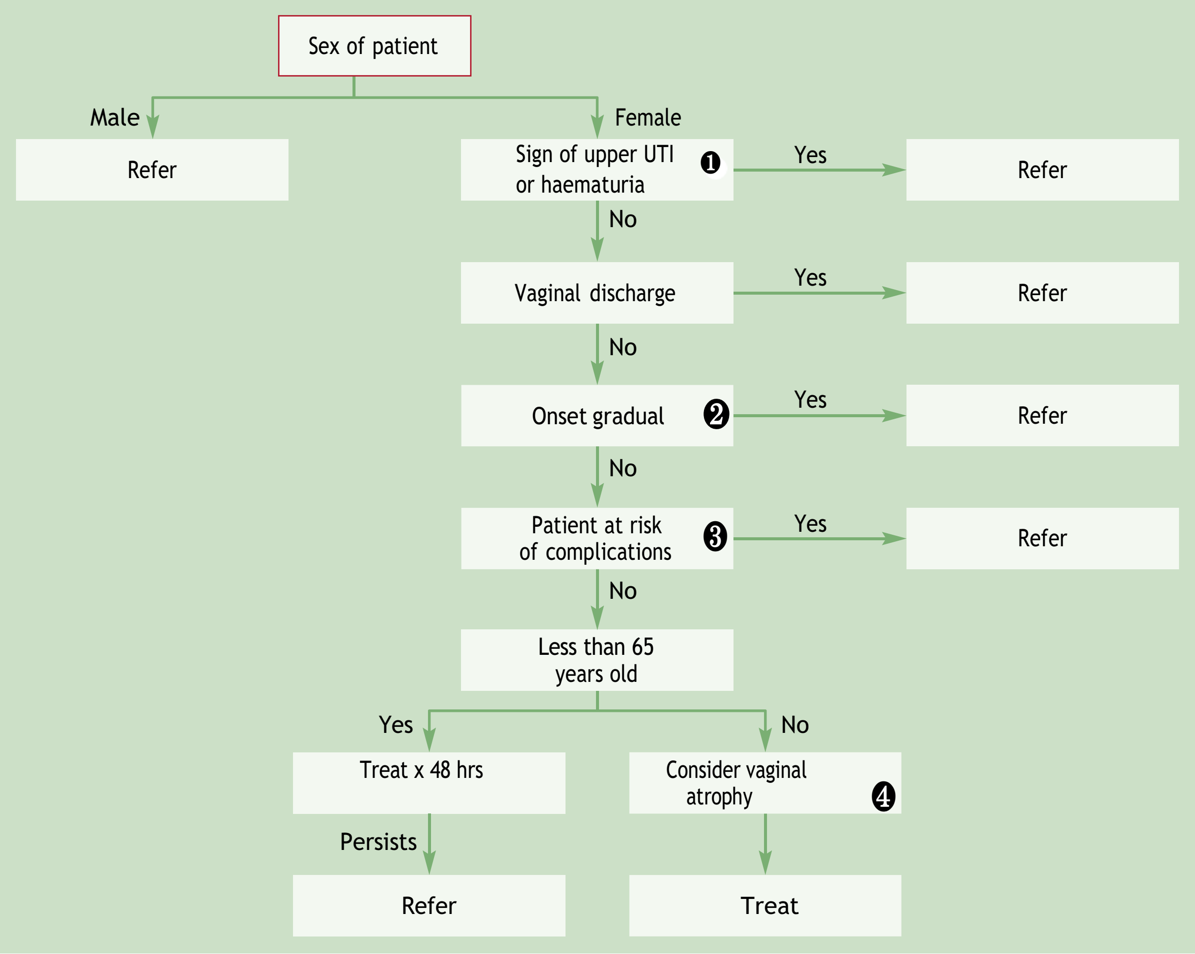
Sex of patient
Male
Refer
Female
Sign of upper UTI or haematuria ❶
Yes
Refer
No
Vaginal discharge
Yes
Refer
No
Onset gradual ❷
Yes
Refer
No
Patient at risk of complications ❸
Yes
Refer
No
Less than 65 years old
Yes
Treat x 48 hrs
Persists
Refer
No
Consider vaginal atrophy ❹
Treat

Fig. 7.1 Primer for the differential diagnosis of cystitis.

❶ **Involvement of the higher urinary tract structures.** Symptoms such as fever, flank pain, nausea and vomiting suggest conditions such as pyelonephritis.

❷ **Gradual onset.** Sexually transmitted disease should be considered in patients whose symptoms are not sudden.

❸ **At-risk patients.** These are people with diabetes, pregnant females and immunocompromised individuals.

❹ **Patients older than 50 years.** Oestrogen deficiency might account for the patient's symptoms, resulting in local atrophy of the vagina. *UTI*, Urinary tract infection.

Reason for referral	Why referring	Timeframe for referral
• Haematuria	• Blood may indicate a stone or a tumour	• Immediate to general practitioner (GP)
• Patients with associated fever, nausea, and flank pain	• Suggests pyelonephritis	

Evidence base for over-the-counter medication

Alkalinizing agents

Current OTC treatment is limited to products that contain alkalinizing agents, such as sodium citrate, sodium bicarbonate and potassium citrate. Alkalinizing agents are used to return the urine pH back to normal, thus theoretically relieving symptoms of dysuria. However, they have little trial data to support their use. A systematic review by O'Kane et al. (2016) concluded that the safety and efficacy of alkalinizing agents are unknown.

Cranberry juice and extract

Cranberry is a popular alternative remedy to treat and prevent UTIs, although few clinical trials have been performed.

Treatment

A Cochrane review on the use of cranberry juice as a treatment for UTIs concluded that there was no good evidence yet to support the use of cranberry juice for the treatment of UTIs (Jepson et al., 2012, updated in 2020).

Prevention

A Cochrane review (Williams et al., 2023) identified 45 studies that compared cranberry juice tablets or capsules with placebo or

Table 7.3
Practical prescribing: Summary of medicines for cystitis

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Potassium citrate	Not recommended	None	None	Patients taking ACE inhibitors, potassium-sparing diuretics or spironolactone	OK
Sodium citrate	Not recommended	None	None	Patients with heart disease, hypertension or renal impairment	OK
Nitrofurantoin	Not recommended	Nausea, vomiting, diarrhoea not known	None	Avoid in immunocompromised patients	Avoid

ACE, Angiotensin-converting enzyme.

HINTS AND TIPS BOX 7.1: CYSTITIS

Options to prevent UTIs	• Wipe from front (vagina) to back (bottom) after using the toilet to stop bacteria spreading from the bowel to the bladder. • Avoid waiting to pass urine. Pass urine as soon as you need to. • Urinate after having sex to flush out any bacteria that may be near the opening to the urethra.
Fluid intake	• Drink about 5 L of fluid during every 24-hour period. This will help to promote bladder voiding, which is thought to help flush bacteria out of the bladder.
Potassium citrate	• The taste is unpleasant. Dilute the mixture with water to make the taste more palatable.
Testing for bacterial infection	• Multiple studies of females with symptoms suggestive of a UTI have demonstrated that the presence of nitrites is highly predictive of a positive culture (predictive value (PV)+ = 75–95%), dipstick showing more than trace leukocytes is nearly as predictive (PV+ = 65–85%), and the presence of both is almost conclusive (PV+ = 95%)

no treatment. They found that the number of UTIs in females who had recurrent UTIs was reduced, although they did not find enough information to determine if cranberry products are effective compared with antibiotics or probiotics.

Practical prescribing and product selection

Alkalinizing products should, when possible, not be recommended, but for completeness, prescribing information relating to such products is discussed and summarized in Table 7.3. Hints and tips relating to patients presenting with cystitis are given in Box 7.1.

Alkalinizing agents (e.g., CanesOasis, Care Cystitis Relief, Cymalon, Cystopurin)

All marketed products are presented as a 2-day treatment course and are taken three times a day, although potassium citrate can be bought as a ready-made solution (the dosage is 10 mL three times a day, diluted well with water). They have very few side effects and can be given safely with other prescribed medication, although in theory, products containing potassium should be avoided in patients taking angiotensin-converting enzyme inhibitors, potassium-sparing diuretics and spironolactone. However, in practice, it is highly unlikely that a 2-day course of an alkalinizing agent will be of any clinical consequence. They can also be prescribed to most patient groups and can be given to pregnant females, although most manufacturers advise against prescribing them in pregnancy, presumably because pregnant females have a higher incidence of complications resulting from cystitis.

Antibiotics

Under UK Patient Group Directions (PGDs), nitrofurantoin can be supplied for acute uncomplicated cystitis. For example, the English Pharmacy First scheme allows supply of nitrofurantoin to nonpregnant females aged 16 to 64 years in the absence of current or recent fever (within the past 48 hours). The dosage is either 100 mg bd or 50 mg qds for 3 days. Nitrofurantoin, like most antibiotics, can cause nausea, vomiting and diarrhoea but is free from any significant drug interactions. Under the PGDs, they cannot be given to pregnant or breastfeeding females, although data suggest they are safe. Symptoms should start to improve within 48 hours of taking nitrofurantoin.

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Vaginal discharge

Background

Patients of any age can experience vaginal discharge. The three most common causes of vaginal discharge are bacterial vaginosis (most common), vulvovaginal candidiasis (thrush) and trichomoniasis (Table 7.4). Because thrush is the only condition for which efficacious OTC products are available, the text concentrates on differentiating this from other conditions.

Table 7.4
Causes of vaginal discharge and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	Bacterial vaginosis
Likely	Thrush
Unlikely	Herpes simplex infection Pelvic inflammatory disease Retained foreign body Sexually transmitted infection (chlamydia, gonorrhoea, trichomoniasis) Vaginitis
Very unlikely	Malignancy

Prevalence and epidemiology

It has been reported that sexually active females have a 75% chance of experiencing at least one episode of thrush during their childbearing years, and half of them will have more than one episode. The condition is uncommon in prepubertal females unless they have been receiving antibiotics. Most cases are acute attacks, but some females can develop recurrent thrush, defined as four or more attacks each year. This may be caused by poor adherence, misdiagnosis, resistant strains of *Candida,* undiagnosed diabetes or the presence of a mixed infection.

Aetiology of thrush

The vagina naturally produces a physiological white to clear, watery, nonoffensive discharge, the amount and character of which vary depending on many factors, such as ovulation, pregnancy and concurrent medication. At the time of ovulation, the discharge is greater in quantity and of higher viscosity. The epithelium of the vagina contains glycogen, which is broken down by enzymes and bacteria (most notably lactobacilli) into acids. This maintains the low vaginal pH, creating an environment that is inhospitable to pathogens. The glycogen concentration is controlled by oestrogen production; therefore, any changes in oestrogen levels will result in increased or decreased glycogen concentrations. If oestrogen levels decrease, glycogen concentration also decreases, giving rise to an increased vaginal pH and making the vagina more susceptible to opportunistic infection, such as *Candida albicans;* 95% of thrush cases are caused by *C. albicans.* The remaining cases are caused by *Candida glabrata*, although symptoms are indistinguishable.

Arriving at a differential diagnosis

Many patients present with a self-diagnosis of thrush, and the pharmacist's role will often be to confirm this self-diagnosis. This is very important because studies have shown that misdiagnosis by patients is common (Ferris et al., 2002) and can have important consequences because other conditions can lead to greater health concerns. For example, bacterial vaginosis has been linked with pelvic inflammatory disease (PID) and the preterm delivery of low-birth-weight infants, and *Chlamydia trachomatis* can cause infertility. Symptoms of pruritus, burning and discharge are possible in all three common causes of vaginal discharge; therefore, no one symptom can be relied on with 100% certainty to differentiate among thrush, bacterial vaginosis and trichomoniasis. Asking symptom-specific questions helps establish a differential diagnosis (Table 7.5).

Clinical features of thrush

The predominant symptom of thrush is vulval itching. Vulval soreness and irritation are also common. Discharge occurs only in about 20% of patients and, if present, has little or no odour and is described as resembling cottage cheese– or curdlike. Symptoms are generally acute in onset.

Table 7.5
Specific questions to ask the patient: Vaginal discharge

Question	Relevance
Discharge	- Malodorous discharge suggests STDs or foreign body. - Physiological discharge is clear and odourless but can cause slight staining of underwear. - Curdlike or cottage cheese–like suggests thrush. - Bacterial vaginosis tends to be grey-white. - Trichomoniasis tends to be greenish-yellow.
Age	- Thrush can occur in any age group. - Bacterial vaginosis and trichomoniasis are common in younger females but rare in premenarchal females. - STDs are rare in older females.
Pruritus	- Vaginal itching is most prominent in thrush. - Itch is less prominent in bacterial vaginosis, trichomoniasis, foreign body and malignancy.
Abnormal or intermenstrual vaginal bleeding	- This can suggest malignancy or PID.
Abdominal pain	- This can suggest STD or PID.
Risk factors that predispose to thrush	Diabetes - Patients with poorly controlled diabetes (type 1 or 2) are more likely to have thrush because hyperglycaemia can enhance production of protein surface receptors on *Candida albicans* organisms. This hinders phagocytosis by neutrophils, thus making thrush more difficult to eliminate. Pregnancy - Hormonal changes during pregnancy alter the vaginal environment and have been reported to make eradication of *Candida* spp. more difficult. Chemical and mechanical irritants - Ingredients in feminine hygiene products (e.g., bubble baths, vaginal sprays, douches) are said to precipitate attacks of thrush by altering the vaginal pH, although evidence for this is limited. Condoms have also been reported to irritate and alter the vaginal pH.

PID, Pelvic inflammatory disease; *STD*, sexually transmitted infection.

Conditions to eliminate

Likely causes

Bacterial vaginosis

Many patients (≤50%) are asymptomatic, but, when symptoms occur, the condition is characterized by a thin white discharge with a strong fishy odour. Odour is worse after sexual intercourse and may worsen during menses. Itching and soreness are not usually present. The exact cause of bacterial vaginosis is unknown but results from an overgrowth of anaerobic bacteria and reduction in lactobacilli concentration. *Gardnerella vaginalis* is often implicated.

Certain risk factors include change in sexual partner, multiple sexual partners, low social class and race (more common in African and African American females). It may remit and relapse for several months. Treatment requires antibiotics (oral metronidazole, 400 mg, twice daily for 5–7 days or local application of metronidazole or clindamycin).

Unlikely causes

Herpes simplex virus infection

Multiple painful blisters or ulcers on the external genitalia are the main clinical feature. However, other symptoms that can be experienced, although rare, include headache, fever, dysuria and vaginal discharge.

Medicines

Corticosteroids, immunosuppressants and medications affecting the oestrogen status of the patient (e.g., oral contraceptives, hormone replacement therapy, tamoxifen, raloxifene) can predispose females to thrush. This is also true with the use of broad-spectrum antibiotics, and it is not unusual to see a patient prescribed an antibiotic and treatment for thrush at the same time.

Pelvic inflammatory disease

PID is often asymptomatic, but if signs and symptoms are experienced, they include lower abdominal pain, pain during sex and associated bleeding after sex, intermenstrual bleeding, frequent and painful urination, fever and large amounts of unusual vaginal discharge.

Retained foreign body (e.g., tampon)

Signs of a retained object include malodorous coloured discharge, vaginal itching, fever, and dysuria.

Sexually transmitted diseases

Risk factors in contracting an STD are increased level of sexual activity and multiple sexual partners.

Chlamydia

Most people (70%) with chlamydial infection are asymptomatic, but when symptoms are experienced, they can include vaginal discharge (which maybe purulent), pelvic pain, intermenstrual bleeding, pain during sex and dysuria.

Gonorrhoea

The most common symptoms include an increased vaginal thick green-yellow discharge, lower abdominal pain and dysuria. Itching is rare.

Trichomoniasis

Up to 50% of patients are asymptomatic. If symptoms are experienced, approximately 30% experience a profuse, frothy, greenish-yellow and fishy-smelling discharge. Other symptoms include vulvar itching and soreness (but less prominent than thrush), vaginal spotting, dysuria and lower abdominal pain. Referral for metronidazole (400 mg bd for 5–7 days) is required.

Vaginitis

Vaginitis is usually associated with vaginal discharge and pain during sex. It can also cause cystitis-like symptoms, although typically it is not associated with urgency or frequency.

Very unlikely cause

Malignancy (cervical, vulval and vaginal cancers)

Unusual vaginal bleeding is most associated with malignancy. Other symptoms can include back and hip pain, vaginal itching and rarely blood-tinged vaginal discharge. Cervical cancer is most common in females in their early 30 and 40s, but vulval and vaginal cancers are most common in females older than age 75 years.

Fig. 7.2 will help in the differentiation of vaginal thrush from other conditions in which vaginal discharge is a major presenting complaint.

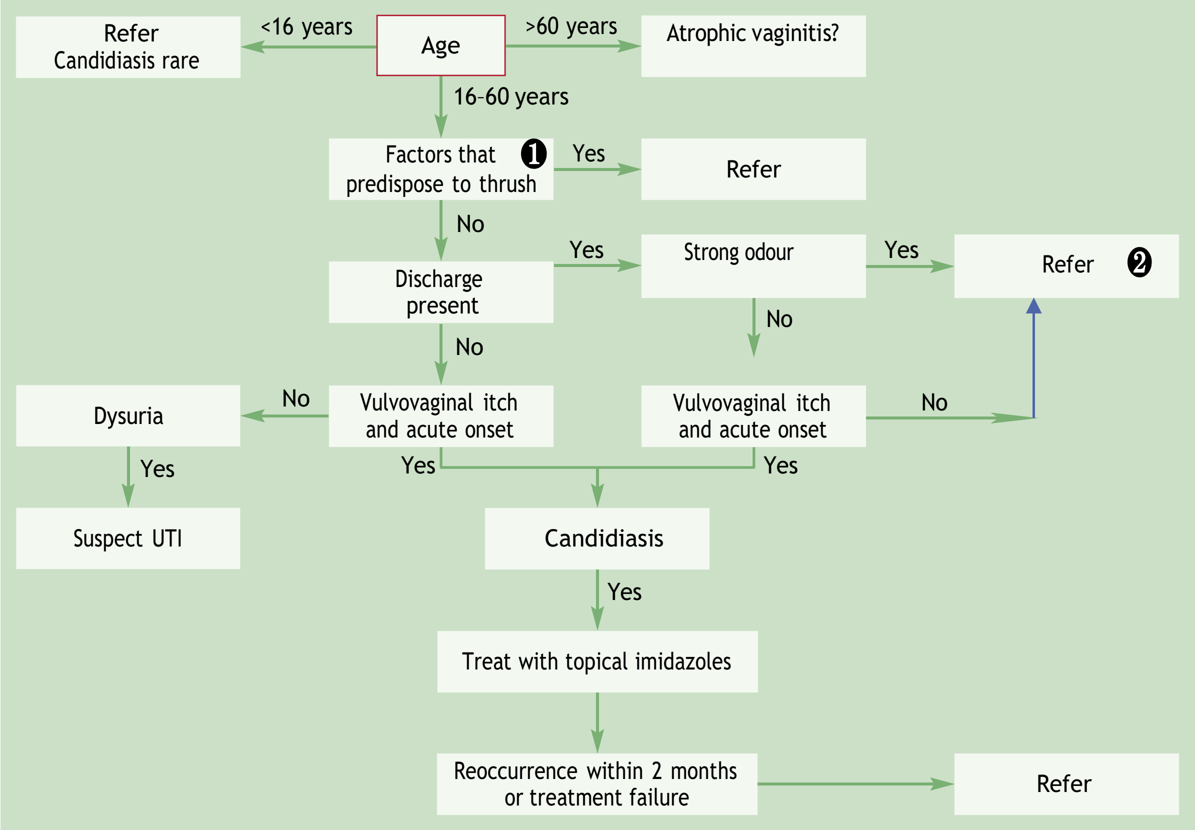
Refer
Candidiasis rare
<16 years
Age
>60 years
Atrophic vaginitis?
16-60 years
Factors that predispose to thrush ❶
Yes
Refer
No
Discharge present
Yes
Strong odour
Yes
Refer ❷
No
No
Dysuria
No
Vulvovaginal itch and acute onset
Vulvovaginal itch and acute onset
No
Yes
Yes
Yes
Suspect UTI
Candidiasis
Yes
Treat with topical imidazoles
Reoccurrence within 2 months or treatment failure
Refer

Fig. 7.2 Primer for the differential diagnosis of vaginal thrush.

❶ Is the person pregnant? Does the person have diabetes or medicine-induced candidiasis?

❷ This could be trichomoniasis or bacterial vaginosis. *UTI,* Urinary tract infection.

Red flags indicative of referral: Vaginal discharge

Reason for referral	Why referring	Timeframe for referral
Recurrent thrush	These can be difficult to treat; often, specialist care is needed through a genitourinary medicine clinic	As soon as possible
Discharge that has a strong smell	Very unlikely to be thrush	
Females younger than 16 years and older than 60 years	Thrush is unusual in these age groups	
Patients with diabetes	Might suggest poor diabetic control	
OTC medication failure	Suggests underlying problem, mixed infection or misdiagnosis	

Evidence base for over-the-counter medication

Topical imidazole's and one systemic triazole (fluconazole) are available OTC to treat vaginal thrush. They are potent and selective inhibitors of fungal enzymes necessary for the synthesis of ergosterol, which is needed to maintain the integrity of cell membranes.

Imidazoles and triazoles have proven and comparable efficacy, with high clinical cure rates. Additionally, cure rates between oral and intravaginal products are comparable (Denison et al., 2020). Treatment choice is therefore driven by patient acceptability and cost.

Practical prescribing and product selection

Prescribing information relating to medicines for thrush is discussed in the next section and summarized in Table 7.6; useful tips relating to patients presenting with thrush are given in 'Hints and tips' in Box 7.2.

Topical imidazoles (clotrimazole, econazole, miconazole)

Formulations for local application include creams, vaginal tablets and pessaries. All internal preparations should be administered at night. This gives the medicine time to be absorbed and eliminates the possibility of accidental loss, which is more likely to occur if the person is mobile. Slight irritation on application is infrequently reported (~5% of users) and has been linked to the vehicle and not the active ingredient. Systemic absorption is minimal; therefore, there are no interactions of note, although they may damage latex condoms and diaphragms. Consequently, the effectiveness of such contraceptives may be reduced. Topical imidazoles have several product licence restrictions, which should be observed when recommending these products, and are listed in Table 7.7.

Fluconazole (e.g., Canesten thrush oral capsule)

Fluconazole is a single oral dose treatment that can be taken at any time of the day. Fluconazole is generally well tolerated, but side effects of nausea, abdominal discomfort, diarrhoea, headache and rash are most often experienced. Established clinically important drug interactions with fluconazole include anticoagulants, ciclosporin, rifampicin, phenytoin and tacrolimus. However, these drug interactions relate to the use of multiple-dose fluconazole, and the relevance to single-dose fluconazole has not yet been established. It would be prudent to avoid these possible interactions and use a topical imidazole instead.

Table 7.6
Practical prescribing: Summary of medicines for thrush

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Imidazoles	Not applicable	Vaginal irritation	None	None	OK, but pregnant females should be referred OK in breastfeeding
Fluconazole	Not applicable	Gastrointestinal disturbances, headache, rash	Anticoagulants, ciclosporin, rifampicin, phenytoin, tacrolimus	None	Avoid

HINTS AND TIPS BOX 7.2: THRUSH

OTC products for bacterial vaginosis	Canetest: swab test ● This helps to differentiate between thrush and bacterial vaginosis. Canesbalance ● This is marketed for treatment by altering pH back to normal physiological levels. Antibiotics (local or systemic) are advised; therefore, Canesbalance should not routinely be recommended.
Applying a pessary	1. Because the dosage is at night, patients should be advised to use the pessary when in bed. Wash your hands. 2. Pull out the plunger from the applicator. 3. Remove the pessary from the packaging and place firmly into the applicator. (The end of the applicator needs to be gently squeezed to allow the pessary to fit.) 4. Lying on your back, with your knees drawn towards your chest, insert the applicator as deeply as is comfortable into the vagina. 5. Slowly press the plunger of the applicator until it stops. 6. Remove and dispose of the applicator. 7. Remain on your back for as long as possible.
Administration of vaginal creams	1. Wash your hands. 2. Pull out the plunger from the applicator. 3. Remove the tube of cream and one applicator from the box (if the applicator is prefilled, skip to point 6). 4. Squeeze the cream from the tube until it reaches the dose level on the applicator. 5. Remove the tube from the end of the applicator. 6. Lying on your back, with your knees drawn towards your chest, insert the applicator as deeply as is comfortable into the vagina. 7. Slowly press the plunger of the applicator until it stops. 8. Remove and dispose of the applicator. 9. Remain on your back for as long as possible.
Use of yoghurt	● Some people recommended live yoghurt as a natural treatment. This is based on sound rationale, because lactobacilli in yoghurt produce lactic acid, which inhibits the growth of *Candida* spp. However, to date, there is a lack of evidence to support its use, so it should not be routinely recommended.
General advice to help prevent infection	● Avoid tight clothing, such as underwear and jeans. ● Use simple nonperfumed soaps when washing.
Symptom resolution	● The symptoms of thrush (burning, soreness or itching of the vagina) should disappear within 3 days of treatment. If no improvement is seen after 7 days, the patient should see their GP.
Vaginal douching	● This should not be encouraged, has no evidence of efficacy and is associated with serious complications such as PID.

Table 7.7
Product licence restrictions: Imidazoles

Product license restriction	Suspected rationale
Younger than 16 years or older than 60 years of age	● Thrush less common in these age groups
Has systemic symptoms	● Suggests infection from a cause other than thrush
Has symptoms that are not entirely consistent with a previous episode (e.g., discharge is coloured or malodourous; ulcers or blisters present)	● Suspect bacterial vaginosis or trichomoniasis
Has had two episodes in 6 months and has not consulted her GP about the condition for >1 year	● Good practice because repeat infection may be caused by misdiagnosis or predisposing risk factors

Continued

Table 7.7
Product licence restrictions: Imidazoles (Continued)

Product license restriction	Suspected rationale
May be pregnant or is breastfeeding	- Topical agents are safe and effective in pregnancy and breastfeeding, although thrush is more common during pregnancy; it is also important to rule out gestational diabetes
Has had a previous STD (or her partner has)	- Rule out STD
Has had abnormal menstrual bleeding or lower abdominal pain	- Symptoms not suggestive of thrush
Does not experience complete resolution of symptoms after 7 days of treatment	- Imidazoles are highly effective; continuing symptoms point to a misdiagnosis

GP, General practitioner; *STD*, sexually transmitted disease.

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Dysmenorrhoea

Background

Dysmenorrhoea is classified as either primary or secondary dysmenorrhoea. Primary dysmenorrhea usually occurs in adolescence shortly after menarche when pain occurs in the absence of pelvic pathology, whereas secondary dysmenorrhoea usually occurs several years after the menarche and has an identifiable pathological cause.

Prevalence and epidemiology

Primary dysmenorrhea is very common, but establishing prevalence rates is difficult because of varying definitions of dysmenorrhoea used in studies, with figures ranging from 16% to 97%. More than 15% of patients experience severe symptoms that are debilitating and cause regular school and work absence.

Aetiology

Overproduction of uterine prostaglandins E_2 and $F_2\alpha$ are major contributory factors in causing painful cramps. Prostaglandin production is controlled by progesterone, and before menstruation starts, progesterone levels decrease, allowing prostaglandin production to increase; if overproduced, cramps occur. On the first day of a period, the level of prostaglandins is high. As bleeding continues and the lining of the uterus is shed, the level goes down. This is why pain tends to lessen after the first few days of a period.

Arriving at a differential diagnosis

The main consideration of the community pharmacist is to exclude conditions that have a pathological cause (Table 7.8). It is essential to take a detailed history of the patient's menstrual history by establishing the frequency, severity and relationship of symptoms to the menstrual cycle (Table 7.9).

Table 7.8
Causes of menstrual pain and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	Primary dysmenorrhoea
Likely	Adenomyosis Endometriosis
Unlikely	Fibroids Intrauterine device Irritable bowel disease Ovarian cyst Pelvic inflammatory disease Premenstrual syndrome Polyps Urinary disorders
Very unlikely	Cervical and ovarian cancer Ectopic pregnancy

Table 7.9
Specific questions to ask the patient: Primary dysmenorrhoea

Question	Relevance
Age	Primary dysmenorrhoea is most common in adolescents and females in their early 20s. Secondary dysmenorrhoea usually affects females many years after the menarche, typically after the age of 30 years.
Pain during sex	Some conditions such as adenomyosis, endometriosis, ovarian cyst, PID and interstitial cystitis can cause pain during sex.
Nature of pain	A great deal of overlap exists between primary dysmenorrhoea and secondary dysmenorrhoea, but generally primary dysmenorrhea results in cramping, whereas secondary causes are usually described as dull, continuous, diffuse pain.
Severity of pain	Pain is rarely severe in primary dysmenorrhoea; the severity decreases with the onset of menses. Moderate to severe lower abdominal pain suggests a secondary cause.
Abnormal bleeding	Frequently seen in PID, ovarian cyst, polyps and ectopic pregnancy.
Gastrointestinal symptoms	They can be prominent in irritable bowel syndrome, ovarian cancer, fibroids and endometriosis.
Onset of pain (relationship to menstruation)	Primary dysmenorrhoea starts very shortly before or within 24 hours of the onset of menses and rarely lasts for more than 3 days. Pain associated with endometriosis typically starts a few days before the onset of menses.

PID, Pelvic inflammatory disease.

Clinical features of primary dysmenorrhoea

A typical presentation of Primary dysmenorrhoea is of lower abdominal cramping pains shortly before (6 hours) and for 2 or possibly 3 days after the onset of bleeding. Commonly associated symptoms include fatigue, back pain, nausea or vomiting and diarrhoea. Pain may radiate to the back and inner thigh. It is typically associated with young females who have recently (6–12 months) started having regular periods. However, there may be a gap of months or years between menarche and the onset of symptoms. This is because as many as 50% of females are anovulatory in the first year (and still 10% of females 8 years after the menarche). This is important to know because anovulatory cycles are usually pain free.

Conditions to eliminate

Likely causes

Adenomyosis

Adenomyosis occurs when endometrial tissue grows into the myometrium. It can be asymptomatic, but if symptoms are experienced, it can cause dysmenorrhoea (sharp, cramping or severe) and heavy periods, painful intercourse, lower abdominal discomfort or pressure and bloating. It tends to occur in females older than 35 years of age and in those with increased parity.

Endometriosis

Endometriosis is the most common cause of secondary dysmenorrhoea; the exact incidence is unclear, but it may affect up to 50% of menstruating females. Many are asymptomatic. Endometriosis occurs when endometrial tissue grows outside of the uterus, most commonly on fallopian tubes, ovaries or the tissue lining the pelvis. Pain is experienced in the lower abdomen and pelvis, which starts before menstruation, but symptoms worsen during menses. Patients may experience pain during or after sex and period-related gastrointestinal (GI) and urinary symptoms. It may cause abnormal bleeding, but this is uncommon. Risk factors have been identified in people developing endometriosis and include a family history, early menarche, nulliparity and White ethnicity. It tends to be diagnosed in females in their 30s or 40s.

Unlikely causes

Fibroids

Fibroids are common and thought to occur in 20% to 50% of females older than 30 years of age, with the incidence increasing during the reproductive years, which then declines after the menopause. They are frequently asymptomatic. If symptoms are experienced, then menstrual irregularity is prominent and accompanied with dysmenorrhoea, pelvic discomfort or pain or back pain, abdominal bloating, urinary tract (frequency, urgency and incontinence) and GI symptoms (constipation). Similar risk factors are seen in fibroids as endometriosis, although black and Asian ethnicity is a risk factor compared with White ethnicity.

Intrauterine devices

Intrauterine devices (IUDs), especially copper IUDs, may cause worsening cramping period pains. These symptoms tend to settle 3 to 6 months after insertion.

Irritable bowel syndrome

IBS is characterized by lower abdominal pain or discomfort and bloating. Unlike causes of dysmenorrhoea, changes in bowel habit and stool consistency are very common. Symptoms of pain and discomfort are frequently relieved by defecation. Other symptoms of lethargy, nausea, backache, and bladder symptoms are common. Young adults (20–40 years old) are most often affected. Symptoms are not related to menstruation.

Ovarian cyst (benign)

An ovarian cyst is a fluid-filled sac that forms on or in the ovary and is often asymptomatic but sometimes causes intermittent lower abdominal or pelvic pain or discomfort associated with heavy periods or bleeding between periods. Other symptoms include pain during intercourse, urinary frequency and constipation.

Premenstrual syndrome

Symptoms are wide ranging and frequently categorized as physical or psychological with many females experiencing a mixture of both. Period pain has been reported but is not a typical physical symptom, and other more prominent symptoms are experienced. Symptoms occur between ovulation and the onset of menstruation and quickly subside when menstruation begins. For further information on premenstrual syndrome (PMS), see later in this chapter.

Pelvic inflammatory disease

PID most commonly develops in young sexually active females, especially those with multiple sexual partners. Vaginal bleeding between periods and after sex can be experienced, and periods themselves can be painful and heavy. It is associated with bilateral lower abdominal pain, abnormal vaginal discharge, irregular menses and dyspareunia. Other symptoms include fever and malaise.

Polyps

Uterine polyps are growths attached to the inner wall of the uterus that extend into the uterine cavity. They are usually benign and asymptomatic and affect females of all ages. Abnormal menstrual bleeding is the most common symptom and appears to increase with age. This is often irregular and unpredictable (e.g., having frequent, variable length and excessively heavy periods). Intermenstrual bleeding and postcoital bleeding can also be seen. Dysmenorrhoea is uncommon.

Urinary disorders

Interstitial cystitis (bladder pain syndrome) is a disorder in which the bladder is overly sensitive and leads to pain in the pelvic area and a frequent urgent need to urinate. Painful sex is common.

Very unlikely causes

Cervical cancer

The most common symptoms of cervical cancer include unusual vaginal bleeding, pain during sex and low back and hip pain.

Ovarian cancer

This is typically seen in older people, especially from 50 years upwards. There are usually no symptoms in the early stages, and unfortunately, it is often detected late. Symptoms include abdominal bloating, feeling full, loss of appetite (leading to weight loss), pelvic or abdominal pain, urinary symptoms such as frequency and urgency and IBS-like symptoms. Other symptoms can include abnormal bleeding, dyspepsia and nausea.

Ectopic pregnancy

Symptoms associated with ectopic pregnancy include abdominal and pelvic pain, vaginal bleeding, shoulder tip pain and urinary and GI symptoms.

Red flags indicative of referral: Menstrual pain

Reason for referral	Why referring	Timeframe for referral
• Heavy or unexplained bleeding • Pain experienced days before menses • Pain that increases at the onset of menses • Females older than 30 years with new or worsening symptoms	• More likely to be a secondary cause	• As soon as practicable
• Vaginal bleeding in postmenopausal females	• Suggests potentially a more sinister cause, such as malignancy	• Same-day referral
• Fever and malaise	• Suggests possible infection or PID	

Evidence base for over-the-counter medication

Non-steroidal anti-inflammatory drugs

The use of NSAIDs would be a logical choice because increased prostaglandin levels cause primary dysmenorrhoea. In multiple clinical trials, they have been shown to be effective in 80% to 85% of females. A Cochrane review (Marjoribanks et al., 2015) included 80 randomized controlled trials (RCTs) (*n* = 5820) and compared 20 different NSAIDs against placebo, paracetamol or each other. NSAIDs were found to be very effective against dysmenorrhoea and although significantly more effective than placebo and paracetamol, there was little evidence of superiority of any individual NSAID.

Hyoscine butylbromide

In one study, Buscopan was given to 17 patients in a double-blind, placebo-controlled, crossover trial (Kemp, 1972). The study failed to demonstrate a significant effect compared with placebo or the comparator drug, aspirin, although in the author's opinion Buscopan was a good alternative to NSAIDs.

Alverine

Alverine is licensed for the treatment of primary dysmenorrhoea. It is an anticholinergic antispasmodic that relaxes the uterine smooth muscle; however, there is a lack of published evidence regarding its efficacy.

Low-dose combined oral contraceptives

Oral contraceptives are licensed (for prescription use) to treat menstrual problems. By inhibiting ovulation, they lessen the endometrial lining of the uterus, reducing menstrual fluid volume and prostaglandin production. A Cochrane review (Schroll et al., 2023) identified 21 trials (*n* = 3723) that compared contraceptives with placebo, each other or NSAIDs. They were found to be more effective than placebo, providing a moderate reduction in pain. Comparison between different 'generations' of contraceptives showed no difference, but continuous use of contraceptives may reduce pain more effectively than the standard 21-day regimen. Only 1 study was included that compared their effect against NSAIDs, and the authors stated there were insufficient data to draw any conclusions. Therefore, if OTC treatment does not control symptoms adequately, the patient should be considered for oral contraceptives.

Other treatment options

Transcutaneous electrical nerve stimulation (TENS), acupuncture, exercise and dietary supplements have been advocated. Of these, high-frequency TENS has the strongest body of evidence to support its use (Proctor et al., 2002). It was found to be effective, but data were drawn from a small number of trials. Exercise performed three times a week for up to 1 hour may be effective, although this is based on low- to moderate-quality evidence (Armour et al., 2019). Evidence was insufficient to determine if acupuncture may reduce pain because data were from small studies of low quality (Smith et al., 2016). A wide range of dietary and herbal interventions is frequently recommended. Most trials were conducted with low patient numbers and have reported inconsistent results or no benefit (Pattanittum et al., 2016). Limited evidence was found for fenugreek, fish oil, ginger, valerian and vitamin B_1. The authors concluded there was currently no high-quality evidence to support any dietary supplements for dysmenorrhoea.

Summary

NSAIDs should be used as first-line therapy unless the patient is contraindicated from using an NSAID. A trial of two to three cycles should be long enough to determine whether NSAID therapy is successful. If NSAIDs are ineffective, then contraceptives could be considered. Currently, the only NSAID available OTC is ibuprofen because naproxen (Feminax Ultra) was discontinued in the United Kingdom in 2021.

Practical prescribing and product selection

Non-drug treatments such as the application of a hot water bottle can be helpful in relieving pain.

Ibuprofen

There is a plethora of marketed ibuprofen products, all of which have a standard dose for the relief of Primary dysmenorrhea. The dosage is 200 to 400 mg (one or two tablets) three times a day, although most patients will need the higher dose of 400 mg three times a day. Because ibuprofen is only used for a few days during each cycle, it is generally well tolerated. However, gastric irritation is possible, and bronchospasm can be triggered in people with asthma who have a history of hypersensitivity to aspirin or NSAIDs. Ibuprofen can interact with many medicines, although most are not clinically significant.

Hyoscine hydrobromide (Buscopan Cramps)

The dosage is two tablets four times a day. It is contraindicated in patients with narrow-angle glaucoma and myasthenia gravis, and care should be exercised in patients whose conditions are characterized by tachycardia (e.g., hyperthyroidism, cardiac problems). Anticholinergic side effects can occur but are uncommon; these include dry mouth, skin reactions and constipation. The anticholinergic effects are potentiated if given with tricyclic antidepressants, antihistamines, butyrophenones, phenothiazines and disopyramide.

Alverine

People older than 12 years of age should take one capsule three times a day. It has no drug interactions, and although side effects have been reported, such as dizziness, headache, nausea and rash, their incidence is unknown.

Table 7.10
Practical prescribing: Summary of medicines for primary dysmenorrhoea

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Ibuprofen	Older than 12 years	Gastrointestinal discomfort, nausea, diarrhoea	Lithium, anticoagulants, methotrexate	Older adults (increased risk of side effects)	Not applicable in pregnancy NSAIDs OK in breastfeeding but avoid hyoscine and alverine because of a lack of data
Hyoscine		None	Other anticholinergics, (e.g., TCAs)	Glaucoma	
Alverine			None	None	

NSAID, Non-steroidal anti-inflammatory drug; *TCA*, tricyclic antidepressant.

Prescribing information relating to these medicines is summarized in Table 7.10.

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Premenstrual syndrome

Background

PMS is a broad term that encompasses a wide range of physical, behavioural, and psychological symptoms. Symptoms range from mild to very severe; severe symptoms, especially mood symptoms, affect approximately 5% of patients and can interfere with daily functioning and relationships (Freeman, 2003).

Prevalence and epidemiology

The exact prevalence of PMS is hard to determine because of varying definitions attributed to PMS and the number of people that do not seek medical help. Surveys have shown that more than 90% of females have experienced PMS symptoms, but only 20% seek medical help, and 13% to 25% have taken time off work. There appears to be no marked differences in the prevalence with age, but symptom severity seems to increase at times of marked hormonal changes.

Aetiology

The precise pathophysiology of PMS is still unclear. Various theories have been put forward, but most researchers now believe that PMS is a complex interaction between ovarian steroids and the neurotransmitters serotonin and gamma-aminobutyric acid.

Arriving at a differential diagnosis

Owing to the varying and wide-ranging symptoms associated with PMS, pharmacists must endeavour to differentiate PMS from other gynaecologic and mental health disorders. It is important not to focus on one cycle's symptoms but ask the patient to describe their symptoms over previous cycles. A diary over three cycles should be maintained to allow a fuller picture of symptoms to be elucidated (validated symptom diaries are available, e.g., the Daily Record of Severity of Problems). Asking symptom-specific questions helps to establish a differential diagnosis (Table 7.11).

Clinical features of premenstrual syndrome

Symptoms occur between ovulation and menstruation. Many symptoms can be experienced with the most common ones listed in Table 7.12. A small proportion of females exhibit severe symptoms, which are more intense and have a greater negative impact on their daily activities and is known as premenstrual dysphoric disorder.

Conditions to eliminate

Primary dysmenorrhoea

Abdominal cramps and suprapubic pain might be experienced by people with PMS, although these symptoms are uncommon. Key distinguishing features between PMS and primary dysmenorrhoea are the lack of behavioural and mood symptoms in primary dysmenorrhoea and the difference in the timing of symptoms in relation to the menstrual cycle.

Table 7.11
Specific questions to ask the patient: Premenstrual syndrome

Question	Relevance
Onset of symptoms	• Symptoms experienced 7–14 days before that disappear a few hours after the onset of menses suggest premenstrual syndrome.
Impact on quality of life	• Assess the severity of symptoms and the degree of impact on daily activity to establish if premenstrual dysphoric disorder might need to be considered.
Cyclical nature of symptoms	• Symptoms can be diverse but should show cyclical patterns in the menstrual cycle.

Table 7.12
Common symptoms of premenstrual syndrome

Physical	Behavioural	Psychological
Swelling	Sleep disturbances	Irritability
Breast tenderness	Appetite changes	Mood swings
Aches	Poor concentration	Anxiety, tension
Headache	Decreased interest	Depression
Bloating or weight gain	Social withdrawal	Feeling out of control

Mental health disorders

Depression and anxiety are common mental health disorders, and patients with PMS might experience symptoms similar to such conditions, namely, persistent depressed or sad mood, loss of interest or pleasure and prominent anxiety or worry. Other symptoms may include disturbed sleep and appetite, dry mouth and poor concentration. However, the symptoms are not cyclical and are not associated with other symptoms of PMS such as breast tenderness and bloating.

Conditions presenting with non-specific symptoms

A number of conditions can present with vague and general symptoms, for example, thyroid disorders, anaemia and chronic fatigue syndrome.

Red flags indicative of referral: Premenstrual syndrome

Reason for referral	Why referring	Timeframe for referral
• Psychological symptoms alone	• If symptoms occur in the non-luteal phase, this could indicate potential anxiety or depressive disorders	• As soon as practicable
• Severe or disabling symptoms	• Suggests premenstrual dysphoric disorder	
• Symptoms that worsen or stay the same after the onset of menses	• Unlikely to be PMS	

Evidence base for over-the-counter medication

Many drug and non-drug treatments are advocated for the treatment of patients with PMS, yet most lack evidence from well-conducted RCTs.

Non-drug treatments

A lack of evidence or no evidence exists to support the use of reflexology, exercise, chiropractic manipulation, bright light therapy and relaxation. Acupressure has shown some limited effect on the psychological and physical symptoms of PMS; however, this is based on low or very low levels of evidence, and there are no comparisons with active treatments (Armour et al., 2018).

Drug treatments

Calcium and vitamin D, ginkgo biloba, evening primrose oil, vitamin B_6, magnesium and Vitex agnus-castus (VAC) have been

Table 7.13

Practical prescribing: Summary of medicines used in premenstrual syndrome

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Pyridoxine	Not applicable	Very high doses can cause toxicity (>500 mg/day)	Levodopa when administered alone	None	Not applicable in pregnancy OK in breastfeeding
Calcium		Nausea, flatulence, constipation	None	Renally impaired patients	
Vitex agnus-castus		Skin reactions		None	

promoted for PMS. Only calcium, vitamin B_6 and VAC seem to have some evidence of efficacy.

A 2016 RCT comparing calcium 400 mg plus vitamin D 400 IU with both placebo and an oral contraceptive in patients with mild to moderate PMS found that both active treatments were significantly more effective than placebo (Shehata, 2016). However, this study has been recently retracted.

Trials involving vitamin B_6 have shown that overall symptoms of PMS improve over a period of 1 to 3 months and help with behavioural and mood symptoms, such as depression (Wyatt et al., 1999). A more recent review also found similar results (Kiani et al., 2016). Caution is needed in interpreting these findings because most of the included trials were small of poor quality and had significant heterogeneity.

A well-conducted, systematic review in 2014 found four studies using VAC at dosages of 20 to 40 mg/day; in all studies, it was found to reduce physical and psychological symptoms by more than 50% compared with the control (Jang et al., 2014). The same review located one study that compared VAC with fluoxetine 20 to 40 mg/day and found no significant difference in efficacy between the two. However, it must be noted that although the quality of the studies was assessed, most studies lacked information on randomization and concealment of allocation.

Summary

The evidence is limited for dietary and herbal supplements for the treatment of patients with PMS. Consequently, bodies such as CKS caution against their use but advocate the use of new-generation combined oral contraceptives for females who exhibit moderate symptoms.

Practical prescribing and product selection

Prescribing information relating to medicines for PMS is discussed and summarized in Table 7.13.

Calcium

Calcium supplementation should provide at least 1200 mg of elemental calcium per day. It is important to ensure that a product taken by the patient provides the required amount of elemental calcium. For example, a calcium lactate 300 mg tablet provides only 39 mg of elemental calcium; calcium carbonate 1.25-g tablets (e.g., Calcichew) provide 500 mg of elemental calcium per tablet. Calcium supplements can cause mild GI disturbances, such as nausea and flatulence, but taking high doses could cause constipation. If the patient is taking tetracycline antibiotics or iron, a 2-hour gap should elapse between doses to avoid the decreased absorption of the antibiotic or iron.

Vitamin B_6 (pyridoxine)

There is no definitive dose of vitamin B_6 recommended to alleviate symptoms of PMS; however, dosages of up to 100 mg/day have been shown to help reduce symptoms. Side effects are extremely rare with doses at this level, although at higher doses, this can cause numbness and peripheral neuropathy. Drug interactions have been observed in patients taking vitamin B_6, most notably phenytoin, phenobarbital and levodopa. Only the vitamin B_6–levodopa interaction is significant and should be avoided. Although doses as low as 5 mg of vitamin B_6 reduce the effects of levodopa, the problem of this interaction in clinical practice is almost always negated because combinations of levodopa plus carbidopa (Sinemet) or levodopa plus benserazide (Madopar) are unaffected by vitamin B_6.

Vitex agnus-castus

The key clinical trials using VAC used a dosage of 20 to 40 mg of VAC extract, equating to approximately 180 to 360 mg of crude dried fruit per day. A number of preparations are available in the United Kingdom; however, there is little standardization of dosing. VAC is generally well tolerated, with no known interactions, but limited adverse effects, mainly skin reactions, can occur.

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Abnormal uterine bleeding

Background

Menstruation spans the years between menarche to menopause. Typically, this lasts 30 to 40 years, starting around the age of 12 years and ceasing around the age of 50 years. The menstrual cycle usually lasts 28 days, but this can vary and last any time between 21 and 45 days. Menstruation itself lasts between 3 and 7 days. Individuals can also exhibit differences in menstrual cycle length and blood flow. Abnormal uterine bleeding can be defined as bleeding from the uterus that is longer than usual or that occurs at an irregular time. Patients often present with heavy bleeding.

Prevalence and epidemiology

The prevalence of menstrual problems and heavy bleeding is difficult to establish because of varying definitions. However, 5% of females aged between 30 and 49 years of age consult their GPs each year (Vessey et al., 1992), and one-third of females describe their periods as being heavy. In the United Kingdom, 20% of females have had a hysterectomy by the age of 60 years, usually because of heavy bleeding.

Aetiology

In approximately half of cases, no identifiable cause can be found. Identifiable causes can result from uterine and pelvic pathology (e.g., fibroids, polyps, carcinoma), systemic disorders (e.g., hypothyroidism) and iatrogenic factors (e.g., medication, intrauterine devices).

Table 7.14
Causes of abnormal uterine bleeding and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Adenomyosis • Fibroid • Polyp
Unlikely	• Complications of pregnancy • Endometriosis • Medicines • Ovarian cyst (benign) • Pelvic inflammatory disease • Polycystic ovary syndrome • Salpingitis
Very unlikely	• Malignancy • Systemic o Coagulation disorders o Hypothyroidism • Uterine myoma

Arriving at a differential diagnosis

Many conditions cause abnormal bleeding (Table 7.14), and asking symptom-specific questions helps to establish a differential diagnosis (Table 7.15), most of which will need onward referral, although heavy bleeding can be managed with tranexamic acid in the interim period between seeing a doctor. This was available OTC (as Cyclo-F) but discontinued in approx. 2020. However, in August 2024, a new poduct was launched (Evena heavy period relief).

Most likely causes of abnormal uterine bleeding

Adenomyosis

Adenomyosis occurs when endometrial tissue grows into the myometrium. It can be asymptomatic, but if symptoms are experienced, it can cause dysmenorrhoea (sharp, cramping, or severe) and heavy periods, painful intercourse, lower abdominal discomfort or pressure and bloating. It tends to occur in females over 35 years of age and in those with increased parity.

Fibroids

Fibroids are common and thought to occur in 20% to 50% of females older than 30 years of age, with the incidence increasing during the reproductive years and declines after the menopause. They are frequently asymptomatic. If symptoms are experienced, then menstrual irregularity is prominent and accompanied with dysmenorrhoea, pelvic discomfort or pain or back pain, abdominal bloating, urinary tract (frequency,

Table 7.15
Specific questions to ask the patient: Abnormal uterine bleeding

Question	Relevance
Timing of bleeding	• Intermenstrual bleeding suggests structural (e.g., fibroids, polyps, or cyst) or a pathological abnormality (e.g., PID, malignancy).
Symptoms in relation to normal cycles	• Patients show cycle-to-cycle variation in the amount of blood loss. It is important to discuss this normal variation with the patient and to determine from the patient whether the patient thinks that blood loss is within the normal range.
Other symptoms	• Most patients present with pain in lower abdomen or back, which is not very discriminatory, however: o Pain + GI or GU symptoms can suggest fibroids, endometriosis or cysts. o Pain + painful sex can suggest adenomyosis, cyst, PID or malignancy.

GI, Gastrointestinal; *GU,* genitourinary; *PID,* pelvic inflammatory disease.

urgency, and incontinence) and GI symptoms (constipation). A number of risk factors have been identified and include a family history; early menarche; nulliparity; and White, and Black and Asian ethnicities.

Polyps

Uterine polyps are growths attached to the inner wall of the uterus that extend into the uterine cavity. They are usually benign and asymptomatic and affect females of all ages. Abnormal menstrual bleeding is the most common symptom and appears to increase with age. This is often irregular and unpredictable, for example, having frequent, variable length and excessively heavy periods. Intermenstrual bleeding and postcoital bleeding can also be seen. Dysmenorrhoea is uncommon.

Table 7.16 summarizes the symptoms of these three conditions other than menstrual bleeding.

Conditions to eliminate

Unlikely causes

Complications of pregnancy

Vaginal bleeding in a pregnant female may indicate miscarriage or ectopic pregnancy.

Endometriosis

Endometriosis is a relatively unusual cause of bleeding and represents fewer than 5% of all cases. Pain is experienced in the lower abdomen and pelvis, which starts before menstruation, but symptoms worsen during menses. Patients may experience period-related GI and urinary symptoms.

Medicines

Medicines are often implicated with menstrual bleeding (Table 7.17). If an adverse drug reaction is suspected, the pharmacist should contact the prescriber and discuss other treatment options.

Ovarian cyst (benign)

An ovarian cyst is a fluid-filled sac that forms on or in the ovary and is often asymptomatic, but sometimes, cysts can cause heavy periods or bleeding between periods. Other symptoms that can be experienced are low back pain, intermittent pelvic pain, abdominal bloating, pain during intercourse, increased urinary frequency and constipation.

Pelvic inflammatory disease

Patients are often asymptomatic or exhibit mild symptoms. Vaginal bleeding between periods and after sex can be experienced, and periods themselves can be painful and heavy. Other symptoms include lower abdominal and pelvic pain, vaginal discharge, painful

Table 7.16
Condition summary of signs and symptoms for polyps, adenomyosis and fibroids

	Dysmenorrhoea	Pain other than dysmenorrhoea	Painful sex	Abdominal discomfort	UTI or GI symptoms
Polyp	Uncommon	No	No	Uncommon	No
Adenomyosis	Common	Pelvic pain	Possible	Common	Unusual
Fibroid	Common	Pelvic and back pain	Possible	Common	Sometimes

GI, Gastrointestinal; *UTI,* urinary tract infection.

Table 7.17
Medications that can alter menstrual bleeding

Anticoagulants
Monoamine oxidase inhibitors
Phenothiazines
Sex hormones, e.g., contraceptives, hormone replacement therapy
Steroids
Tamoxifen
Thyroid hormones

sex, fever and dysuria. PID is almost always caused by a STD and is therefore most seen in younger females, especially those with multiple sexual partners.

Polycystic ovary syndrome

Females have infrequent periods or no periods. Skin problems occur such as hirsutism, usually on the face, chest and back; acne; and rough, dry skin. Patients are often overweight and have a positive family history.

Salpingitis

Bilateral lower abdominal pain, fever and vaginal discharge are the predominant symptoms. Irregular menstrual bleeding (e.g., spotting between periods), nausea and vomiting and UTI symptoms can also be experienced.

Very unlikely causes

Malignancy

Endometrial cancer

Almost all cases (90%) are diagnosed in postmenopausal females. Bleeding is the main symptom. Bleeding is initially slight and intermittent but may become constant and heavy. Other symptoms can be pelvic discomfort and pain (late symptom), pain during sex and difficult or painful urination.

Ovarian cancer

This is typically seen in older people, especially from 50 years upwards. Symptoms include abdominal bloating, feeling full, loss of appetite (leading to weight loss), pelvic or abdominal pain, urinary symptoms such as frequency and urgency and IBS-like symptoms. Other symptoms can include abnormal bleeding, dyspepsia and nausea.

Cervical cancer

The most common symptoms of cervical cancer include unusual vaginal bleeding, pain during sex and low back and hip pain. Cervical cancer is most common in females in their 30s and 40s.

Vulval and vaginal cancer

These are relatively rare cancers. Both can be associated with bleeding between periods. However, other symptoms will be present. Persistent itch is common to both cancers as well as palpable lump or growth. In vaginal cancer, discharge that smells or is blood stained is often seen.

Systemic causes

Coagulation disorders

A history of heavy menstrual bleeding since menarche accompanied with other indicators of haemorrhage should be present such as dental-related bleeding, bleeding gums, epistaxis and bruising easily.

Hypothyroidism

This can cause frequent and heavy periods. However, other symptoms should be obvious such as fatigue, weight gain, cold intolerance, dry and coarse hair and forgetfulness.

Uterine myoma

This is usually asymptomatic but can present with heavy or irregular menstrual bleeding. Pelvic examination may show an enlarged, nodular pelvic mass that can vary in size and shape.

Red flags indicative of referral: Abnormal uterine bleeding

Reason for referral	Why referring	Timeframe for referral
• Intermenstrual bleeding or postcoital bleeding, especially in postmenopausal females	• Possibility of malignancy	• Urgent referral
• Bleeding whilst pregnant	• Suggests miscarriage	
• Easily bruised or other bleeding	• Suggests coagulation problem	• As soon as practicable

Evidence base for over-the-counter medication

Non-steroidal anti-inflammatory drugs

Increased levels of prostaglandins can contribute to uterine bleeding and pain. NSAIDs could therefore be offered to help control symptoms.

Antifibrinolytics

Antifibrinolytics stop the conversion of plasminogen to plasmin, an enzyme that digests fibrin and thus brings about clot dissolution. A Cochrane review (Bryant-Smith et al., 2018) identified 13 studies (n = 1312 participants) comparing antifibrinolytic agents versus placebo, no treatment or other medical treatment in females of reproductive age with heavy menstrual bleeding. Despite some concern over the quality of the studies, the authors concluded these were effective for treating heavy menstrual bleeding.

Practical prescribing and product selection

Non-steroidal anti-inflammatory drugs

Ibuprofen at standard dosages of 400 mg three times a day can be offered. Those with prescribing rights may consider mefenamic acid (500 mg three times a day).

Tranexamic acid

The dosage, for those over 18 years of age, is two tablets three times a day for a maximum of 4 days, although this can be increased to two tablets four times a day with very heavy menstrual bleeding. The maximum dosage is eight tablets (4 g) daily. Side effects are rare but can include mild nausea, vomiting and diarrhoea.

Visual disturbances and thromboembolic events have been reported but are very rare. The causal relationship of thromboembolic events and tranexamic acid is unclear, and NICE guidelines (2018) state that no increase in the overall rate of thrombosis has been identified with females taking tranexamic acid. Nevertheless, females at high risk of thrombosis should ideally avoid taking it. Tranexamic acid should be used with caution in patients taking anticoagulants or combined oral contraceptives. In breastfeeding females, one small unpublished study suggested that only low levels of tranexamic acid pass into breast milk and that waiting 3 to 4 hours before breastfeeding will minimise any risk.

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Table 7.18
Terms associated with the menopause

Term	Definition
Perimenopause	• The period immediately before the menopause (when the endocrinologic, biological and clinical features of approaching menopause commence) and the first year after menopause
Menopausal transition	• The period of time before the final menstrual period when variability in the menstrual cycle is usually increased
Climacteric	• The phase in the aging of females marking the transition from the reproductive phase to the non-reproductive state; this phase incorporates the perimenopause by extending for a longer variable period before and after the perimenopause
Climacteric syndrome	• The climacteric is sometimes, but not necessarily always, associated with symptomatology; when this occurs, it may be termed the 'climacteric syndrome'
Postmenopause	• Defined as dating from the final menstrual period regardless of whether the menopause was induced or spontaneous
Premature menopause	• The age of 40 years is frequently used as an arbitrary cutoff point, below which menopause is said to be premature
Induced menopause	• The cessation of menstruation which follows either surgical removal of both ovaries (with or without hysterectomy) or iatrogenic ablation of ovarian function (e.g., by chemotherapy or radiation)

Vaginal atrophy in postmenopausal females

Background

The term *menopause* literally means the last menstrual period. There are varying terminologies associated with the menopause, although The International Menopause Society and the World Health Organization have put forward definitions with the aim of standardizing the terminology used when discussing the menopause (Table 7.18). The menopause can manifest with a wide range of symptoms, and the deregulation (2022) of oestradiol vaginal tablet allows OTC treatment of patients with atrophic vaginitis.

Prevalence and epidemiology

With increasing age, menstruation decreases in frequency and finally ceases at about the age of 50 years. The menopausal transition most often begins between ages 45 and 55 years. It usually lasts about 7 years but can be as long as 14 years. Clinically, a female is said to postmenopausal at a point in time 12 months after their final period. Sometimes it may be difficult to define precisely when the menopause occurs, especially if the female begins to take hormone replacement therapy during the menopause.

Aetiology

Ovarian function begins to decline approximately 10 years before the cessation of menses and reflects depletion of the follicular reserves during reproductive life. The menstrual cycle starts to become erratic, and in the early part of menopausal transition, one or two cycles are missed per year, which increases to three or more missed cycles per year during latter part of transition. At this time, the ovaries begin to produce less oestrogen and progesterone but follicle-stimulating hormone (FSH) and luteinizing hormone (LH) increase in response to the ovaries becoming less responsive to their effect. Overall, the levels of oestrogen and progesterone fall dramatically. Low levels of oestrogen can result in hot flushes, night sweats, palpitations, headaches, insomnia, fatigue, bone loss and vaginal dryness. A lack of progesterone causes periods to be irregular, heavy or longer. In addition, testosterone levels also fall but more slowly. Declining testosterone levels can contribute to low libido and changes in cognitive function and mood.

Arriving at a differential diagnosis

Symptoms typically associated with the perimenopause and menopause include menstrual change, vasomotor symptom, insomnia, sexual dysfunction, urogenital tract symptoms and cognitive and psychological symptoms. Symptoms experienced are specific to an individual, but hot flushes, night sweats, irritability, insomnia, decreased sexual interest, pain (e.g., headaches and joint pain) and vaginal dryness are very commonly reported.

Clinical features of atrophic vaginitis

Females experience thinning of the endometrial lining because of a reduction in oestrogen levels. This can also lead to symptoms of vaginal dryness, soreness, burning, itching and painful sex. Symptoms may be experienced for a number of years beyond menopause, and vaginal dryness can increase over time.

Conditions to eliminate

A number of conditions can exhibit local symptoms. For further information on these conditions, please see the sections on vaginal discharge and abnormal uterine bleeding.

Red flags indicative of referral: Atrophic vaginitis

Reason for referral	Why referring	Timeframe for referral
• Vaginal bleeding or postcoital bleeding in a postmenopausal female	• Suggests a potentially more sinister cause, such as malignancy	• Same day
• Discharge that has a strong smell	• Very unlikely to be vaginitis	• As soon as practicable
• Lower abdominal or back pain or genitourinary symptoms	• Suggests other causes such as salpingitis, PID, cyst or malignancy	
• Associated prominent itch	• Suggests thrush: reassess patient	• Not applicable

Evidence base for over-the-counter medication

A Cochrane review (Lethaby et al., 2016) included 30 studies (n = 6235 females) comparing different intravaginal oestrogenic preparations with each other and with placebo. All preparations in the forms of creams, pessaries, tablets and oestradiol-releasing ring were shown to be effective for the symptoms of vaginal atrophy.

Practical prescribing and product selection

Ostradiol hemihydrate (Gina)

Ostradiol hemihydrate (equivalent to oestradiol 10 µg), as a vaginal tablet, can be given to postmenopausal females after the age of 50 years. For females who have not previously used local oestrogen therapy, the dosage is one vaginal tablet daily for 2 weeks; then a maintenance dose of one tablet twice a week is recommended.

The product is sold as a 24 pack of vaginal tablets, thus providing 7 weeks of treatment. Providing symptoms have improved and the patient is still suitable for supply, then ongoing treatment can be provided.

Side effects and drug interactions are few given its local application. Patients may experience abdominal pain, headache and vaginal symptoms at the start of treatment.

Well-recognized risks are associated with systemic use of unopposed oestrogen, which are rarely associated with local application; however, if used for the long term, these need consideration. These include venous thromboembolism, heart disease and liver disorders. If a patient has a history of such problems, then a referral to a GP should be made before the patient starts treatment. In addition, all patients with a history of endometriosis also need GP assessment before use.

HINTS AND TIPS BOX 7.3: SUPPLY OF GINA

Patients who already take hormone replacement therapy	• Gina can still be given provided they have previously been prescribed a local oestrogen.
Patients switching between other local oestrogens	• Providing the patient has used the previous local oestrogen for more than 3 months and symptoms are controlled, then switching is appropriate.

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Contraception: Progestogen-only pills

Background

Contraceptive effectiveness of progestogen-only pills (POPs) relies on correct use. If used perfectly, POPs may be more than 99% effective, but typical use suggests the risk of pregnancy during the first year of use has been estimated at about 9%.

General overview of the female reproductive anatomy

The female reproductive anatomy is composed of internal and external genital organs. The external genital organs include the mons pubis, labia majora and minora, Bartholin glands and clitoris. Their role is to allow sperm to enter the vagina, protect the internal genital organs and provide sexual pleasure. The internal genital organs are composed of the vagina, uterus, fallopian tubes and ovaries. The vagina is approximately 4 to 5 cm long and is a muscular tubelike organ. It is lined by a mucous membrane and is kept moist by fluids produced by the lining and the cervix, which is found at the opening of the uterus. The main function of the uterus is to sustain developing foetuses. It is a muscular, pear-shaped organ, lined with two layers of cells called the endometrium. The outer layer of the endometrium, called the functional layer, changes in response to oestrogen and progesterone as part of the menstrual cycle.

Hormonal changes during the menstrual cycle and the action of desogestrel

The pattern of the menstrual cycle is affected by the rise and fall of four hormones: FSH, LH, oestrogen and progestogen. After menses, which typically lasts 5 days, oestrogen levels begin to increase, causing the endometrium to thicken and grow. At the same time, FSH is produced, which causes follicle growth in the ovary (the follicular phase). This typically takes place from day 6 to day 14 of the cycle. At around day 14, ovulation occurs and is triggered by a sudden surge in LH. After ovulation (the luteal phase, days 15–28), the egg travels through the fallopian tube to the uterus. At this time, progesterone increases to help prepare the uterine lining for pregnancy. If fertilization and implantation of the embryo do not occur, the lining of the endometrium is shed during menses.

The contraceptive effect of desogestrel relies primarily on an antigonadotrophic effect that inhibits ovulation. Progestogen negative feedback works at the hypothalamus to decrease the frequency of the gonadotropin-releasing hormone reducing the secretion of FSH and LH. In addition, there are contraceptive effects on the viscosity of cervical mucus, on the endometrium and on activity of cilia in the fallopian tube.

Evidence base for over-the-counter medication

The efficacy of POPs and desogestrel is well established. However, it is more difficult to determine if one POP is better than

HINTS AND TIPS BOX 7.4: SUPPLY OF DESOGESTREL

Starting treatment after miscarriage or abortion or after childbirth	• Miscarriage or abortion: Start taking immediately or within 5 days after miscarriage or abortion. There is no need for additional contraception. • After childbirth: The female should start taking any day between days 1 and 21 after childbirth. If starting after 21 days, an additional method of contraception should be used for the first week.
Switching from other hormonal forms of contraception	• For all forms of contraception (combined pill, vaginal ring, patch, minipill, injection, implant or IUD), providing desogestrel is started immediately after the stoppage or removal of the other contraceptive, then there is no need for additional contraception.
Starting desogestrel after emergency contraception (EC)	• Levonorgestrel: Start immediately and take additional contraception (e.g., condoms) for 2 days. • Ulipristal: Delay start for 5 days after ulipristal and additional contraception for a further 2 days.
Missed pill advice	• Desogestrel is considered missed if it is taken more than 12 hours late. In such circumstances, the female should take the most recent missed pill as soon as possible and be advised to take the next pill at the usual time (this may mean taking two pills in 1 day). In these situations, additional contraceptive precautions (e.g., condoms) for 48 hours after correct pill taking has restarted. • If more than 36 hours has elapsed since taking the last dose, then contraceptive protection will be reduced. In these circumstances, EC should be considered.
Diabetes	• There is a possible chance that desogestrel may alter glucose control. If the patient needs to adjust insulin doses or sees blood glucose control worsen during the first months of use, then they should see the GP.

another. A Cochrane review (Grimes et al., 2013) concluded that desogestrel may be more effective than levonorgestrel; however, the potential for better efficacy with desogestrel was offset by worse bleeding patterns and more adverse events than with levonorgestrel.

Practical prescribing and product selection

Before assessment and supply of desogestrel, it is important to provide the female patient with all contraceptive options and inform them of the effectiveness of desogestrel with both typical and perfect use.

Desogestrel (Hana, Lovima)

Both are licensed for use in females of childbearing age. Before starting treatment, an assessment needs to be made of the likelihood the female is pregnant and checks should be done on personal history to exclude malignancy and current liver or thromboembolic disease. In addition, supply should not proceed if the female has undiagnosed vaginal bleeding. If the female is suitable for supply, then the first tablet should be taken on the first day of menstrual bleeding (provides immediate contraceptive cover). The dosage is one tablet every day taken without interruption. Female should ideally take their pills at about the same time each day to maintain suppression of ovulation. The initial supply should be for 3 months.

Commonly reported side effects include altered mood, decreased libido, headache, acne, weight increase, breast pain and changes to menstrual pattern. It can also cause nausea and vomiting. If vomiting occurs within 3 to 4 hours of tablet taking, then a further tablet should be taken. Interactions between desogestrel and other drugs may lead to breakthrough bleeding or contraceptive failure, most notably enzyme inducers because they can result in increased clearance of sex hormones. This effect lasts for 28 days after stopping the enzyme inducer. Desogestrel has no adverse effects on lactation.

Reference

Grimes, D. A., Lopez, L. M., O'Brien, P. A., & Raymond, E. G. (2013). Progestin-only pills for contraception. *Cochrane Database System Review, 11*, CD007541.

Websites

Faculty of Sexual and Reproductive Healthcare: FSRH clinical guideline: Progestogen-only pills. https://www.fsrh.org/documents/cec-guideline-pop

Family Planning Association. https://www.fpa.org.uk

Emergency contraception

Background

The intention of the UK government policy on making EC available through pharmacies (in 2001) was to improve access for patients requiring EC at times when other providers might be closed (e.g., weekends, evenings). This policy has been effective, with community pharmacy now being the main provider of EC, either as an OTC sale or as part of a locally commissioned service. Furthermore, studies have consistently demonstrated that females obtain EC more quickly from community pharmacies than from other providers (Public Health England, 2019). This is relevant because EC is more effective the sooner it is taken after unprotected sex. Some concerns have been raised about females misusing EC because of its greater accessibility. However, a review of international experience with pharmacy supply of EC found only a small proportion of females use EC repeatedly (6.8% using it twice in 6 months and 4.1% using it three times) (Anderson & Blenkinsopp, 2006). Two OTC products are available in the United Kingdom for EC, levonorgestrel and ulipristal.

Prevalence and epidemiology

Despite easier access to EC, in 2021 there were 214 256 abortions conducted in England and Wales. This is the highest number since the Abortion Act was introduced in 1967. Those aged 22 years were most likely to have an abortion.

Aetiology

The exact mechanism of action for levonorgestrel is not clear. It appears to have more than one mode of action at more than one site. It is thought to work mainly by preventing ovulation and fertilization if intercourse has taken place in the preovulatory phase. It is also suggested that it causes endometrial changes that discourage egg implantation. Ulipristal is a selective progesterone receptor modulator and works by delaying ovulation for at least 5 days until sperm from unprotected sex are no longer viable via suppression of the LH surge.

Evidence base for over-the-counter medication

The exact effectiveness of EC is hard to establish because many people who have been treated with EC will not have become pregnant even without treatment. Trial data for levonorgestrel have found it to prevent 86% of expected pregnancies when treatment was initiated within 72 hours. Levonorgestrel is more effective the earlier it is taken after unprotected sex; it prevents 95% of pregnancies if taken within 24 hours, 85% between 24 and 48 hours and 58% if used within 48 to 72 hours. Ulipristal acetate has been demonstrated to be more effective than levonorgestrel from 0 to 120 hours after unprotected sex. Ulipristal is therefore medicine of choice.

Practical prescribing and product selection

Assessing patient suitability

Pregnancy is theoretically possible after unprotected sex on most days of the cycle, although it is extremely unlikely to occur in the first 3 days of a natural menstrual cycle. Pregnancy risk is highest after unprotected sex that takes place during the 6 days leading up to and including the day of ovulation.

However, it can be difficult to predict whether an episode of unprotected sex occurred during a female's fertile period. Therefore, EC should be considered if a female does not wish to conceive and has had unprotected sex on any day of a natural menstrual cycle.

EC may also be indicated if contraception has been used incorrectly or been compromised (e.g., vomiting). The FSRH 2023 guidance provides detailed information for indications of EC. Tables 7.19 and 7.20 summarize prescribing information and FRSH guidance.

Table 7.19
FRSH guidance on when to provide EC

Method	Situation leading to possible contraceptive failure	Indication for emergency contraception
• Combined oral contraceptive pill (monophasic pill containing ethinyleostradiol)	• Missed active pills (if two or more active pills are missed)	• It is indicated if pills are missed in week 1 and there has been unprotected sex or barrier failure during the pill-free interval or week 1. • If the pill-free interval is extended (this includes missing pills in week 1), a copper IUD can be offered up to 13 days after the start of the hormone-free interval assuming previous perfect use.
• POP	• Late or missed pill (>27 hours since last traditional POP or >36 hours since last desogestrel-only pill)	• It is indicated if a pill is late or missed and there has been unprotected sex or barrier failure before efficacy has been reestablished (i.e., 48 hours after restarting).

Table 7.20
Practical prescribing: Summary of medicines for Emergency contraception

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in which care is exercised	Pregnancy and breastfeeding
Levonorgestrel	Older than 16 years	For both: nausea, headache, disturbed menstrual cycle, abdominal pain, fatigue, dizziness Levonelle specific: breast tenderness ellaOne specific: mood disorders, back or pelvic pain	Enzyme inducers, including anticonvulsants, rifampicin, St. John's Wort, antiretrovirals	Conditions in which absorption may be impaired, e.g., Crohn's disease	Pregnancy: not applicable Breastfeeding: safe to use
Ulipristal	Any female of childbearing age			Not suitable for use by females who have severe asthma controlled by oral glucocorticoids	Pregnancy: not applicable Breastfeeding: avoid for 1 week

HINTS AND TIPS BOX 7.5: EMERGENCY CONTRACEPTION

Effect of weight or body mass index (BMI)	• The effectiveness of levonorgestrel can be reduced if a female has a BMI >26 kg/m^2 or weight >70 kg. It is recommended that either ulipristal or a double dose (3 mg) of levonorgestrel is given in this situation[a].
Females taking enzyme-inducing medicines	• The effectiveness of both levonorgestrel and ulipristal may be reduced if a female is using an enzyme inducer. It is recommended that a double dose (3 mg) of levonorgestrel can be used, but its effectiveness is unknown[a]. • Use of double-dose ulipristal is not currently recommended.
Unprotected sex that took place >120 hrs a go	• Females should be signposted to services that provide a copper IUD.
Sexually transmitted infection (STI) risk	• All females requesting EC should be assessed as to their risk of STI and offered advice on testing and how to access this.
Menstrual disturbance	• If the period is lighter than normal or >7 days late, then a pregnancy test needs to be carried out.
Advice after use of EC	• **Levonorgestrel:** Females should be advised to start suitable hormonal contraception immediately. Females should be made aware that they must use condoms reliably or abstain from sex until contraception becomes effective. • **Ulipristal:** Females should be advised to wait 5 days after taking ulipristal before starting suitable hormonal contraception. Females should be made aware that they must use condoms reliably or abstain from sex during the 5 days waiting and then until their contraceptive method is effective.
Advanced sale requests	• Advanced sale of levonorgestrel is permitted. However, the clinical appropriateness of a supply needs to be considered. If a female asks for repeat requests, they should be advised to use more reliable methods of contraception.

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[a] This is an unlicensed use of levonorgestrel.

Levonorgestrel (Levonelle One Step)

Levonorgestrel should be taken as soon as possible and within 72 hours after unprotected sex or contraceptive failure. The dosage consists of a single tablet (levonorgestrel 1500 µg). About 1 in 5 patients experience nauseam but only 1 in 20 go on to vomit. If the patient vomits within 3 hours of taking the dose, they should be advised to take a further dose. A number of medicines do, theoretically, interact with levonorgestrel, most notably those that are enzyme inducers and include anticonvulsants, although the clinical significance of the interactions appears low because only a handful of drug interaction reports have been received by the manufacturers. However, contraceptive failure may be increased, and such patients are best referred to a doctor. Females who breastfeed should be informed that available limited evidence indicates that levonorgestrel has no adverse effects on breastfeeding or on their infants.

Ulipristal acetate (ellaOne)

The treatment consists of one tablet to be taken as soon as possible but no later than 120 hours (5 days) after unprotected sex or contraceptive failure. If vomiting occurs within 3 hours, another tablet should be taken. Side effects and drug interactions are very similar to those of levonorgestrel. Patients with severe asthma managed with oral corticosteroids should not take ulipristal. Breastfeeding females should be advised not to breastfeed and to express and discard milk for a week after they have taken ulipristal.

References

Anderson, C., & Blenkinsopp, A. (2006). Community pharmacy supply of emergency hormonal contraception: A structured literature review of international evidence. *Human Reproduction, 21*, 272–284.

Public Health England. (2019). The Pharmacy Offer for Sexual Health, Reproductive Health and HIV. A resource for commissioners and providers. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/788240/Pharmacy_Offer_for_Sexual_Health.pdf

Further reading

Thayer, N., White, S., & Frisher, M. (2022). Use of path analysis to predict changes to community pharmacy and GP emergency hormonal contraception (EHC) provision in England. *BMJ Open, 12*, e059039.

Websites

British Pregnancy Advisory Service. https://www.bpas.org

Brook Advisory Centres. https://www.brook.org.uk

ellaOne provides online help for patients to assess suitability for supply. https://www.ellaone.co.uk/suitability-checker

National Institute for Health and Care Excellence. NICE public health guidance 51: Contraceptive services for under 25s. https://www.nice.org.uk/guidance/ph51

Public Health England. Sexual and reproductive health profiles. https://fingertips.phe.org.uk/profile/sexualhealth

Self-assessment questions

The following questions are intended to supplement the text. Two levels of questions are provided, multiple-choice questions and case studies. The multiple-choice questions are designed to test factual recall, and the case studies allow knowledge to be applied to a practice setting.

Multiple-choice questions

7.1 Which ONE of the following listed side effects is least commonly associated with ulipristal?

a. Abdominal pain
b. Dizziness
c. Headache
d. Insomnia
e. Nausea

7.2 Which ONE of the following would you not recommend as suitable OTC treatment for vulvovaginal candidiasis?

a. Clotrimazole, 10% vaginal cream
b. Fluconazole, 150-mg oral capsule
c. Clotrimazole, 500 mg pessary
d. Ketoconazole, 2% cream
e. Clotrimazole, 1% topical cream

7.3 A 39-year-old female presents with what she describes as ‘period pain’. On further questioning, you ascertain that the aching pain, which can be quite severe, seems to be worse about 1 week before her period and is also worse during intercourse. Which ONE of the following conditions is she most likely to be have?

a. PID
b. Primary dysmenorrhoea
c. Endometrial carcinoma
d. Endometriosis
e. Cervical carcinoma

7.4 Which ONE of the following symptoms are not commonly associated with premenstrual syndrome?

a. Sleep disturbances
b. Breast tenderness
c. Vaginal discharge
d. Headache
e. Fluid retention

7.5 Which ONE of the following set of symptoms most closely matches that of vaginal thrush?

a. Itch and discharge described as having an offensive odour
b. Itch, burning sensation and curdlike discharge
c. Little itching but frothy yellow discharge
d. Little or no itch but increased urgency and pain on passing urine
e. Little itching but associated with blood-stained discharge

7.6 Which ONE of the following symptoms is commonly associated with trichomoniasis?

a. Frothy, green-yellow, vaginal discharge
b. Clear, watery, vaginal discharge
c. Cottage cheese–like vaginal discharge
d. White, fishy-smelling, vaginal discharge
e. Small ulcers on the external genitalia

7.7 A female presents with what she thinks is cystitis. Which ONE of the following symptoms would cause you to refer her to a doctor?

a. Pain when passing urine
b. Increased frequency of urination
c. Increased urgency of urination
d. Pain in the loin area
e. Voiding small amounts of urine

7.8 Which ONE of the following patient groups is not considered at risk of developing an upper UTI?

a. Patients with gout
b. Diabetic patients
c. Those who have an indwelling catheter
d. Immunocompromised patients
e. Patients with history of kidney stone

7.9 Dysuria accompanied by fever and flank pain is indicative of which ONE of the following?

a. Cystitis
b. Trichomoniasis
c. Pyelonephritis
d. Vaginitis
e. Salpingitis

7.10 Jane Williams, a 53-year-old female, asks for fluconazole. You remember her from about 1 month ago when she also had thrush. On questioning, you discover that this is her fourth attack of thrush in the past 12 months. Jane uses a beclomethasone inhaler (200 μg twice a day) for her asthma and takes the minipill. You inform Jane that she should see her GP. Jane asks why she cannot just buy it because she knows it will relieve her symptoms. Please select the most appropriate response to Jane’s question.

a. Because of her age, she has less oestrogen, which will make her more prone to fungal infections. Her GP needs to review her.

b. Because of her inhaler, she is more prone to thrush, and her GP needs to be aware of these symptoms.
c. Fluconazole can interfere with the minipill, and she would be better off using a clotrimazole pessary.
d. Repeated thrush may indicate diabetes, so her GP will need to check her blood glucose level.
e. Tell her that the guidelines suggest referral to a doctor, but on this occasion, you will sell her the pessary if she books an appointment with her GP within 3 days.

7.11 Which ONE of the following is the maximum length of time after unprotected sex in which levonorgestrel can be given?

a. 24 hours
b. 48 hours
c. 72 hours
d. 96 hours
e. 120 hours

7.12 In which ONE of the following circumstances should you refer a patient with cystitis?

a. If the urine is cloudy
b. If the patient has dysuria
c. If pain is felt in the loin area
d. The onset of the attack is sudden
e. Micturition is frequent

7.13 Which ONE of the following symptoms is least likely experienced in vulvovaginal candidiasis?

a. Superficial dyspareunia
b. Vaginal itching and soreness
c. Dysuria
d. A thin white discharge
e. Discharge associated with a strong odour

7.14 In which ONE of the following circumstances involving PMS would you consider that referral is required?

a. Mood swings and anxiety
b. Weight gain
c. Breast tenderness
d. Fluid retention
e. Sleep disturbances

7.15 Which ONE of the following statements is false regarding primary dysmenorrhoea?

a. It is most common in adolescents and females in their early 20s.
b. Pain typically starts just before the period starts.
c. Pain is described as dull and continuous.
d. Pain tends to decrease once the period has begun.
e. Back pain is often experienced.

Questions 7.16 to 7.21 concern the following conditions:

A. Primary dysmenorrhoea
B. Pelvic inflammatory disease
C. Endometriosis
D. Menorrhagia
E. Endometrial carcinoma
F. Bacterial vaginosis
G. Thrush

Select, from A to G, which is:

7.16 Most common in young sexually active females with multiple partners

7.17 Caused by the overproduction of uterine prostaglandins

7.18 The key symptom is blood loss perceived to be more than normal

7.19 Pain that starts shortly before menses

7.20 Usually seen in postmenopausal females

7.21 Associated with strong odour

Questions 7.22 to 7.25 concern the following conditions:

A. Cystitis
B. Vulvovaginal candidiasis
C. Trichomoniasis
D. Bacterial vaginosis
E. Atrophic vaginitis
F. Endometriosis

Select, from A to E, which of the above conditions:

7.22 Has a frothy greenish-yellow discharge

7.23 Can be treated with topical imidazoles

7.24 Is commonly caused by *E. coli*

7.25 Usually seen in postmenopausal females

Answers

7.1 Answer: d

Rationale: All side effects listed have been reported with ellaOne. Options a–c and e are listed in the SmPc as common, whereas insomnia (d) is uncommon.

7.2 Answer: d

Rationale: Azole preparations are the mainstay of treatment for candidiasis, but the license for ketoconazole (d) states it is for tinea pedis, tinea cruris and candidal intertrigo.

7.3 Answer: d

Rationale: Endometrial (c) and cervical (e) cancers are not commonly associated with period pain as the predominant symptom. PID (a), primary dysmenorrhoea (b) and endometriosis (d) cause pain. Typically, however, endometriosis (d) presents with pain several days before menses.

7.4 Answer: c

Rationale: People with PMS exhibit a wide range of physical and psychological symptoms. Of those listed, however, vaginal discharge (c) is not associated with this condition.

7.5 Answer: b

Rationale: Itch is prominent with thrush, so this excludes options c to 3, and non-malodorous, ruling out option (a); This leaves option b as the correct answer.

7.6 Answer: a

Rationale: In trichomoniasis, discharge is observed, so e can be excluded; discharge is also coloured, so b can also be excluded. The colour of discharge with trichomoniasis tends to be greenish-yellow, and thus the answer is a.

7.7 Answer: d

Rationale: Options a to c and e are typical symptoms associated with cystitis. Pain in the loin area (d) suggests that the infection might have risen to a higher anatomic structure and could be a sign of pyelonephritis.

7.8 Answer: a

Rationale: A suppressed immune system means that a UTI is more likely (i.e., options b, people with diabetes, and d, immunocompromised individuals). Kidney stones (e) and catheters (c) could interfere with urine flow and predispose people to cystitis.

7.9 Answer: c

Rationale: Fever suggests infection; from this list, cystitis (a), vaginitis (d) and salpingitis (e) are not infections and are not associated with fever as a symptom. This leaves trichomoniasis (b) and pyelonephritis (c). Pyelonephritis is associated with fever and flank pain compared with trichomoniasis, whose predominant feature is discharge.

7.10 Answer: d

Rationale: Glycogen concentrations can be altered in patients with diabetes, and these individuals are therefore predisposed to thrush.

7.11 Answer: c

Rationale: Product licenses state the levonorgestrel EC can be given up to 72 hours. There is some evidence that it could be given up to 96 hours, but this is not advocated because ulipristal is highly effective up to 120 hours.

7.12 Answer: c

Rationale: Cystitis often presents with sudden symptoms (d), frequency (e), dysuria (b) and, less commonly, cloudy urine (a). Loin pain (c) might suggest that the infection has ascended to a higher anatomic structure and needs further evaluation.

7.13 Answer: e

Rationale: Itching (b) is the hallmark symptom. A white discharge (d) does occur in a proportion of patients. Dyspareunia (a) and dysuria (c) are possible but uncommon. However, discharge with odour is very unlikely and associated with STIs.

7.14 Answer: a

Rationale: Symptoms are wide ranging and include all options listed. However, option a is associated with premenstrual dysphoric disorder and thus is most appropriate to refer.

7.15 Answer: c

Rationale: Period pain usually begins around the onset of menstruation (a), pain is seen before the period starts (b) and lessens after it has started (d) and not all but a substantial number of females experience back pain (e).

7.16 Answer: f

Rationale: PID (b), endometriosis (c), menorrhagia (d) and carcinoma (e) are more common in older females. STDs are most seen in young females. Primary dysmenorrhea *(a), bacterial vaginosis (f) and thrush (g) are seen in young females, but one with a sexual history suggests bacterial vaginosis is most likely.*

7.17 Answer: a

Rationale: PID (b), bacterial vaginosis (f) and thrush (g) are infections. Menorrhagia (d) is excessive blood loss, Carcinoma (e) can be ruled out. This leaves endometriosis (c) and primary dysmenorrhoea (a). The exact cause of endometriosis is unknown, but a genetic link has been observed.

7.18 Answer: d

Rationale: Blood loss or bleeding is not associated with bacterial vaginosis (f) or thrush (g). All other options can cause bleeding, but menorrhagia (d) is most associated with excessive blood loss.

7.19 Answer: a

Rationale: Pain is not a prominent symptom in menorrhagia (d), carcinoma (e), bacterial vaginosis (f) and thrush (g). Of the three remaining options in which pain is prominent, only in primary dysmenorrhea (a) is pain seen shortly before menses.

7.20 Answer: e

Rationale: As is the case with most cancers, they are associated with advancing age.

7.21 Answer: f

Rationale: Only one condition listed is associated with strong odour, and that is bacterial vaginosis.

7.22 Answer: c

Rationale: Discharge is observed in thrush (b), trichomoniasis (c) and bacterial vaginosis (d). Thrush and bacterial vaginosis tend to have a white discharge.

7.23 Answer: b

Rationale: Patients with trichomoniasis (c), bacterial vaginosis (d),atrophic vaginitis (e) and endometriosis (f) should be referred for suitable treatment. Cystitis (a) may be managed with a 2-day course of OTC treatment of sodium or potassium citrate. Imidazoles (b) are the mainstay of treatment for thrush.

7.24 Answer: a

Rationale: This suggests a bacterial cause of the problem, so only cystitis (a), trichomoniasis (c) and bacterial vaginosis (d) need to be considered. Trichomoniasis is a protozoan infection, and bacterial vaginosis is most associated with Gardnerella *spp.*

7.25 Answer: e

Rationale: STDs are associated with younger females, so trichomoniasis (c) and bacterial vaginosis (d) can be ruled out. Endometriosis (e) is associated with menstruating females. Although cystitis (a) and thrush (b) can be experienced by all females, atrophic vaginitis (e) is closely associated with postmenopausal females.

Case studies

CASE STUDY 7.1

A female aged about 30 years comes into your pharmacy and asks to speak to you. She tells you that she thinks she has thrush again. When she had similar symptoms before, she saw the doctor, who prescribed her a cream to use. Although it was effective, it was messy, so she asks whether there is anything else she could use instead.

a. What questions do you need to ask?

There is a need to confirm her self-diagnosis. Although she has had similar symptoms, it is always best to double check; therefore, ask questions about the nature of the symptoms, such as itch and discharge. It is also worth finding out how long ago she saw her physician to check for frequency of recurrence.

b. What other factors should be considered?

Questions should be aimed at deciding whether the patient is suitable for an OTC product, internal or oral. Questions of this nature are generally linked to ensuring that the patient does not fall outside the product license restrictions of an imidazole vaginal pessary or oral fluconazole.

c. In addition to supplying a product, is there anything else you could recommend?

- *Avoid local irritants, including perfumed products such as vaginal deodorants, soaps and bubble bath.*
- *Avoid wearing tight-fitting trousers and tights. Loose-fitting cotton underwear allows the skin to breathe more.*
- *Spermicides such as nonoxynol-9 may disturb the vaginal flora and contribute to infection.*
- *Probiotics (e.g., live yoghurt) may be used orally or topically. Although there is no evidence that probiotics are effective, they will not cause any harm and can be cooling to the affected area when used topically. However, these are messy to use, which is something the patient wants to avoid.*

d. At what point would you recommend referral?

Antifungals are highly effective at treating thrush. One would expect symptoms to be improved or resolved within 72 hours. If this is not the case, then the person should be reassessed.

CASE STUDY 7.2

Mrs PR, a 26-year-old female, presents on Saturday afternoon asking for something for cystitis. She tells you she has had the symptoms for about 2 days and has tried no medication to relieve the symptoms. The patient takes no medicine from the doctor.

a. What are your initial thoughts about possible diagnoses?

Based on her age, cystitis is likely. Her age also means that an STI is possible.
It appears we are dealing with an acute presentation. This 'fits' with both cystitis and STI. It also means other conditions, which tend to be chronic, are less likely.

b. Information gathering: What questions do you need to ask?

At this point we only know how long the person has had the symptoms. Given we are working to a hypothesis of acute uncomplicated UTI, questions should be asked which help to test this hypothesis. Initially, though, we need to find out what symptoms she has.

You find out that Mrs PR has pain on urination and discomfort, and she is going to the toilet frequently. She had these symptoms previously, about 2 years ago, but they went away on their own after 1 or 2 days.

c. In what way does this information confirm or refute your working hypothesis?

She has described 'classical' symptoms of an uncomplicated UTI.

d. Problem refinement: What other questions could be asked to help confirm your thinking?

***Location of the pain**: Pain would not be expected in and around the kidneys. This helps to rule out an upper UTI.*
***Any other associated symptoms:** If Mrs PR has an uncomplicated UTI, it would be unlikely she has any vaginal discharge (often seen in STIs, foreign body) or fever (upper UTI problem).*

e. What course of action are you going to take?

Her symptoms seem highly suggestive of an acute uncomplicated UTI and advice on adequate fluid intake and taking simple analgesia to manage discomfort. There seems to be nothing in her history which suggests she is at high risk of complications. The need for antibiotics seems low.

She returns 3 days later saying the symptoms are still present.

f. Is supply of an antibiotic now appropriate?

Given symptoms have not resolved in 5 days, an antibiotic seems warranted. A 3-day course of either nitrofurantoin or trimethoprim should be given but Mrs PR should be advised that if symptoms worsen or fail to improve over the next 48 hours they need to be further assessed.

CASE STUDY 7.3

A female in her late teens or early 20s asks for some painkillers for period pain. She volunteers that the pain came on yesterday and is across her stomach (she points to an area of the lower abdomen around and below the umbilicus) and describes the pain as uncomfortable and crampy.

a. How would you frame the problem representation?

Young female presents with a 24-hour history of generalized lower abdominal cramping pain

b. What are the most likely causes of her pain?

Based on her age, the most likely cause is primary dysmenorrhoea. Because of her age, we also need to consider:

- *PID*
- *Complications of IUD insertion*
- *IBS*
- *Ectopic pregnancy*
- *STI*

c. What questions, at this point, would help with the differential diagnosis?

Menstrual cycle history

- *Establishing when the pain starts in relation to menses and the nature or evolution of symptoms will help in determining if primary dysmenorrhoea is the cause.*

Sexual history

- *This will help in establishing if an IUD or the possibility of being pregnant or having an STI are the cause of symptoms.*

You find out that her period is due imminently and that she has had similar symptoms over the past few cycles. The pain is normally manageable with paracetamol. She is currently not in a relationship, does not use any hormonal contraception and hasn't had sex for many months.

d. From this information, what are your thoughts?

Ectopic pregnancy, IUD and STIs can be ruled out. Dysmenorrhoea still seems most likely. IBS has yet to be ruled out.

e. What question(s) could you ask to discriminate between dysmenorrhea and IBS?

Ask about GI symptoms: Although dysmenorrhoea can cause GI symptoms, these are unusual. In IBS, these are common.
Non-cyclical nature of symptoms: IBS symptoms are experienced at times other than menses.

CASE STUDY 7.4

A female White patient, Ms X, approximately 30 years of age, presents to you saying she has thrush. She says she has a white discharge, and her symptoms have been present for the past 2 days. She is otherwise healthy and has no medical problems.

a. Define the problem representation,

A 30-year-old female presents with a 2-day history of white vaginal discharge.

b. What conditions are uppermost in your thinking as to the diagnosis?

- *Bacterial vaginosis*
- *Thrush*

c. How would differentiate between these two problems?

Both thrush and bacterial vaginosis are associated with a white discharge, although thrush is described as curdlike or cottage cheese–like and bacterial vaginosis as thin. Discharge of thrush has little or no odour, whereas bacterial vaginosis is malodorous.

Ms X describes the discharge as white and thin, and she denies any unpleasant odour. You believe she has thrush.

d. What other questions could be asked to help confirm your diagnosis?

Itch: This is very prominent in thrush but not bacterial vaginosis.

She tells you that she has experienced some itching, but it is not too bad.

It seems thrush is more likely than bacterial vaginosis, but you are not too confident.

e. What could you further ask to help with your diagnosis?

Explore risk factors associated with bacterial vaginosis
Previous history of similar symptoms

f. Before providing any advice or starting treatment, are there any red flag symptoms you would want to check for?

Vaginal bleeding to rule out malignancy

Chapter 8

Gastroenterology

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Background

The main function of the gastrointestinal (GI) tract is to break down food into a suitable energy source to allow normal physiological function of cells. The process is complex and involves many different organs. Consequently, many conditions affect the GI tract, some of which are acute and self-limiting and respond well to over-the-counter (OTC) medication and others that are serious and require referral.

General overview of the anatomy of the gastrointestinal tract

It is vital that pharmacists have a sound understanding of GI tract anatomy. Many conditions present with similar symptoms and from similar locations (e.g., abdominal pain), so pharmacists need a basic knowledge of GI tract anatomy and where each organ of the GI tract is located to facilitate a correct differential diagnosis.

Oral cavity

The oral cavity is composed of the cheeks, the hard and soft palates and the tongue. The process of digestion starts in the oral cavity. The tongue and cheeks position large pieces of food so that the teeth can tear and crush food into smaller particles. Saliva moistens, lubricates and begins the process of digesting carbohydrates (by secreting amylase enzymes) before swallowing.

Stomach

The stomach is roughly J-shaped and receives food and fluid from the oesophagus. It empties into the duodenum. It is located slightly left of midline and anterior (below) to the rib cage. The lesser curvature of the stomach sits adjacent to the liver. Its functions are to temporarily store, mix and initiate the breakdown of food. It mechanically breaks down food and mixes it with gastric secretions to produce a thick liquid mixture known as chyme and releases it into the small intestine.

Liver

The liver is located below the diaphragm and mostly right of midline in the upper right quadrant of the abdomen. The liver performs many functions, including carbohydrate, lipid and protein metabolism and the processing of many medicines.

Gallbladder

The gallbladder is a pear-shaped sac that lies deep to the liver and hangs from the lower front margin of the liver. Its function is to store and concentrate bile made by the liver.

Pancreas

The pancreas lies behind the stomach. It is essential for producing digestive enzymes transported to the duodenum via the pancreatic duct and secretion of hormones such as insulin.

Small intestine

The small intestine is where most of the absorption of nutrients and medicines occur. It is composed of three sections, the duodenum, the jejunum and the ileum. The duodenum starts at the exit of the stomach and its main roles are to neutralize stomach acid and initiate the chemical digestion of chyme. The jejunum is a small section that joins the duodenum and ileum whose primary function is to absorb sugars, amino acids and fatty acids. In the ileum, the mucosa becomes highly folded to form villi that increase the surface area and facilitate the absorption of soluble molecules.

Large intestine

The large intestine starts with the caecum, which is where the appendix connects to the gut. This is followed by the colon and ends with the rectum. The role of the large intestine is largely to absorb water and expel waste.

Painful oral lesions

Background

Lesions that cause oral pain are common. Typically, they are self-limiting, and management is aimed at symptomatic relief of pain. Most patients who present with painful oral lesions have minor aphthous ulcers (MAUs).

Prevalence and epidemiology

The prevalence of MAUs is poorly understood but probably affects 20% of the UK population. They occur in all ages, but it has been reported that they are more common in females, those younger than the age of 40 years and non-smokers.

Aetiology

The cause of MAUs is unknown, although about 40% of people have a family history of oral ulceration. A number of theories have been put forward to explain why people develop MAUs, including a genetic link, stress, trauma, food sensitivities, nutritional deficiencies (iron, zinc, and vitamin B_{12}) and exposure to certain foods, but none has so far been proven.

Table 8.1
Causes of painful oral lesions and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Minor aphthous ulcers
Likely	• Major aphthous ulcers • Trauma
Unlikely	• Hand, foot and mouth disease • Herpangina • Herpes simplex • Herpetiform • Medicine-induced • Oral thrush
Very unlikely	• Erythema multiforme • Stevens-Johnson syndrome or toxic epidermal necrolysis • Systemic lupus erythematosus • Systemic conditions that present with aphthous-like ulcers ○ Behçet syndrome ○ Coeliac disease ○ Crohn's disease and ulcerative colitis ○ Human immunodeficiency virus (e.g., immunodeficiency) ○ Vitamin B_{12}, iron or folate deficiency

Table 8.2
Specific questions to ask the patient: Painful oral lesions

Question	Relevance
Number of ulcers	• Minor aphthous ulcers (MAUs) occur singly or in small crops. • A single large, ulcerated area is more indicative of major ulcers. • Patients with numerous ulcers are more likely to have herpetiform ulcers.
Location of ulcers	• Ulcers on the side of the cheeks, tongue and inside of the lips are likely to be MAUs. • Ulcers located towards the back of the mouth are more consistent with major or herpetiform ulcers.
Size and shape	• Irregular-shaped ulcers tend to be caused by trauma. • If ulcers are large or very small, then MAU is unlikely.
Age	• Young people: suggests herpangina; herpetic gingivostomatitis; or hand, foot and mouth disease. • Increasing age is associated with malignancy.
Other symptoms	• MAU is not associated with systemic symptoms. • Unlikely causes, which often have sinister pathology, often exhibit symptoms of systemic upset.

Arriving at a differential diagnosis

Aphthous ulcers is a collective term used to describe various clinical presentations of superficial, painful oral lesions that occur in recurrent bouts at intervals from a few days to a few months. Other types of ulcers can be seen and need to be differentiated from aphthous ulcers (Table 8.1). A number of questions should be asked to help establish a differential diagnosis (Table 8.2). In addition, an inspection of the oral cavity should be performed.

The physical examination

The oral cavity (Fig. 8.1) can be easily observed in the pharmacy, provided the mouth can be viewed with a good light source, preferably a pen torch. Steps involved in performing an oral examination are detailed as follows:

1. Explain what you want to do and gain consent.
2. Wash your hands.
3. Examine the area where the lesion(s) or pain originates from. Look at the size, shape and colour of the lesion(s). Note any redness or swelling local to the area.
4. After the presenting problem has been inspected, check the rest of the oral cavity for any further signs or symptoms. It is possible that other parts of the mouth are affected but have not been noticed by the patient.
   Lips and gums: Check for signs of a healthy mouth, that is, no signs of tooth decay or nicotine staining, periodontal disease (bleeding gums) and ulceration.
   Tongue: Check for signs of non-painful abnormalities.
   Buccal mucosa: Inspect for abnormalities such as ulcers and leukoplakia.
   Floor of the mouth: Check for infection and ulceration.
5. Explain to the patient the examination is finished and thank them.
6. Wash your hands.
7. Relate back to the patient what you found.

Clinical features of minor aphthous ulcers

The ulcers are roundish and grey-white in colour. They are small, usually less than 1 cm in diameter, and shallow, with a raised red rim. Pain can make eating and drinking difficult, although pain subsides after 3 or 4 days. They rarely occur on the gingival mucosa and occur singly or in small crops of up to five ulcers. It normally takes 7 to 14 days for the ulcers to heal, but recurrence typically occurs after an interval of 1 to 4 months (Fig. 8.2).

Conditions to eliminate

Likely causes

Major aphthous ulcers

These account for 10% to 15% of cases and are characterized by large deep ulcers (>1 cm in diameter). Crops of ulcers occur but

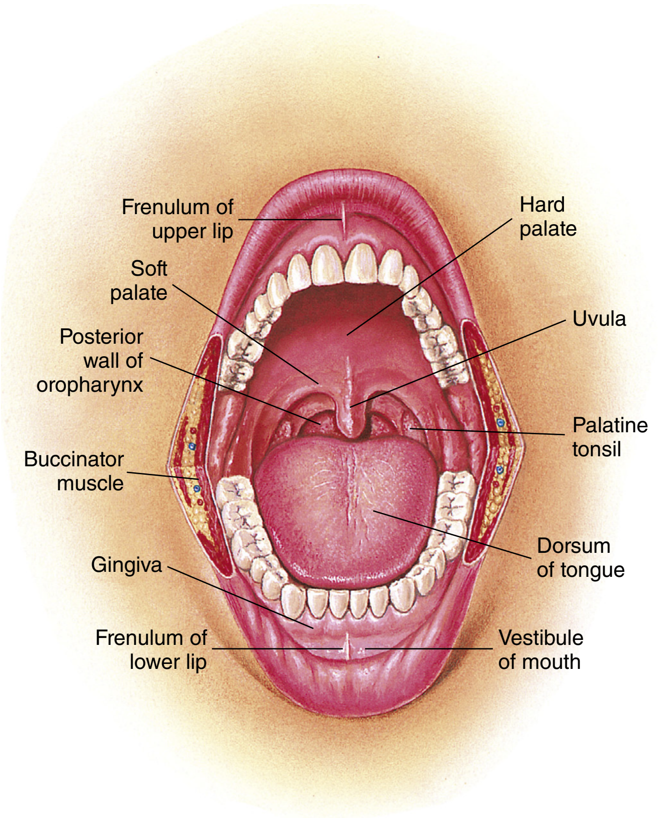

Fig. 8.1 The oral cavity. (From Flanagan, A. L. [2019]. Otorhinolaryngologic surgery. In: J. Rothrock (Ed.), *Alexander's care of the patient in surgery*. Elsevier.)

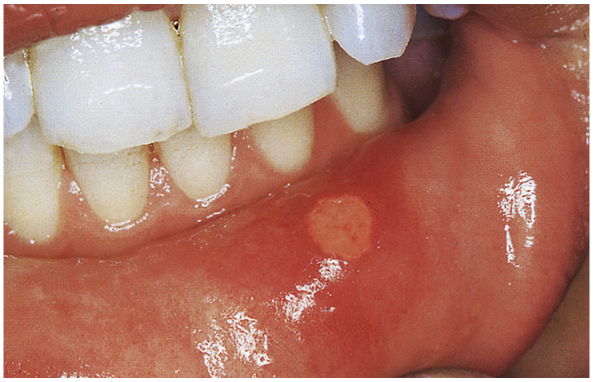

Fig. 8.2 Minor aphthous ulcer. (From Cawson, R., et al. [2002]. *Essentials of oral pathology and oral medicine*. [7th ed.]. Churchill Livingstone.

often coalesce to form one large ulcer. These ulcers are slow to heal, typically taking 3 to 4 weeks, and may cause scarring (Fig. 8.3). They can affect any area of the oral cavity.

Trauma

Trauma to the oral mucosa results in damage and ulceration. Trauma may be mechanical (e.g., tongue biting) or thermal, resulting in ulcers with an irregular border. Patients should be able to recall the traumatic event and have no history of similar ulceration or signs of systemic infection (Fig. 8.4).

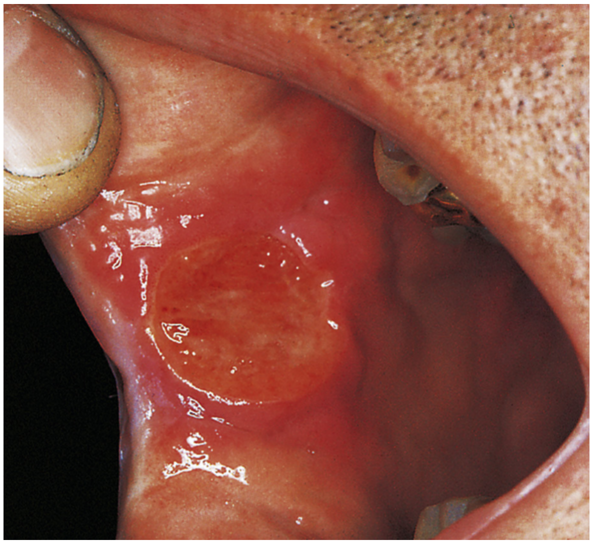

Fig. 8.3 Major aphthous ulcer. (From Cawson, R., et al. [2002]. *Essentials of oral pathology and oral medicine* [7th ed.]. London: Churchill Livingstone.)

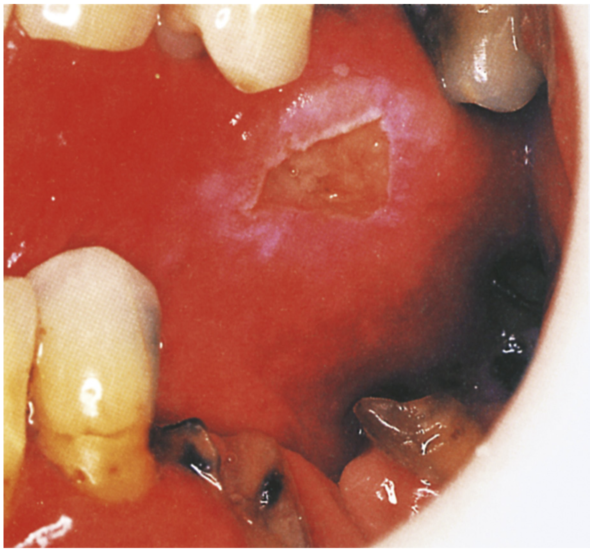

Fig. 8.4 Ulcer caused by trauma. (From Wray, D., Lowe, G. D. O., Dagg, G. H., et al. [1999]. *Textbook of general and oral medicine*. London: Churchill Livingstone.)

Unlikely causes

Hand, foot and mouth disease

Hand, foot and mouth disease (HFMD) is generally a mild disease that is usually caused by the coxsackievirus A16. It is mainly seen in children younger than 5 years (95% of cases), although it can also appear in older children and adults. It presents with malaise and low-grade fever before the development of oral lesions that appear in and around the mouth, palate and pharynx, appearing as shallow yellow-grey ulcers surrounded by an erythematous halo (Fig. 8.5). A rash exhibiting macules and papules on the dorsal and palmar surfaces of the hands and feet then occurs. The lesions start pink and change to greyish blisters. It is contagious, and good hygiene is required to prevent it from spreading to others.

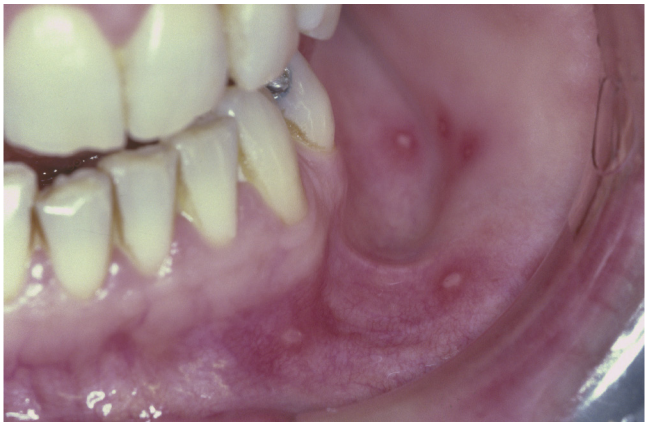

Fig. 8.5 Hand, foot and mouth disease. (From *Oral and maxillofacial pathology* [5th ed.]. 2024.)

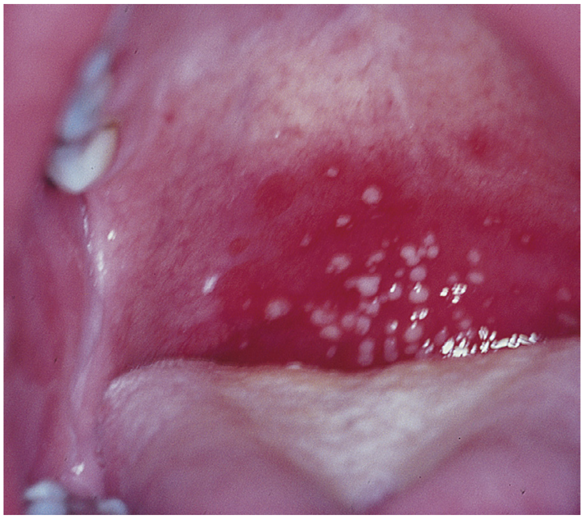

Fig. 8.6 Herpangina. (From Bennett, J. E., et al. [Eds]. [2015]. *Mandell, Douglas, and Bennett's principles and practice of infectious diseases* [8th ed]. Philadelphia, Elsevier.)

Herpangina

Herpangina is seen mainly in children up to 10 years of age. Clinically, it presents as an acute febrile illness with a sore throat and ulcers at the back of the mouth. Nausea and abdominal symptoms can also be seen. Red spots appear within hours (up to 1 day later) in the mouth and throat. The red spots become raised into small vesicles, which form a tiny yellowish ulcer with a red rim. The ulcers are generally 1 to 2 mm in diameter (Fig. 8.6). The ulcers take 5 to 10 days to heal.

Herpetiform ulcers

Herpetiform ulcers are pinpoint and often occur in clusters (up to 100 at a time), which can coalesce. They can occur anywhere in the oral cavity but are often seen in the posterior part of the mouth, an unusual location for MAU (Fig. 8.7). They usually heal within 7 to 14 days.

Medicine-induced ulcers

A number of case reports have been received of medication causing ulcers. These include cytotoxic agents, nicorandil, alendronate, non-steroidal anti-inflammatory drugs (NSAIDs; including aspirin), antimicrobials (azoles and tetracycline) and beta-blockers. Ulcers are often seen at the start of therapy or when the dose is increased.

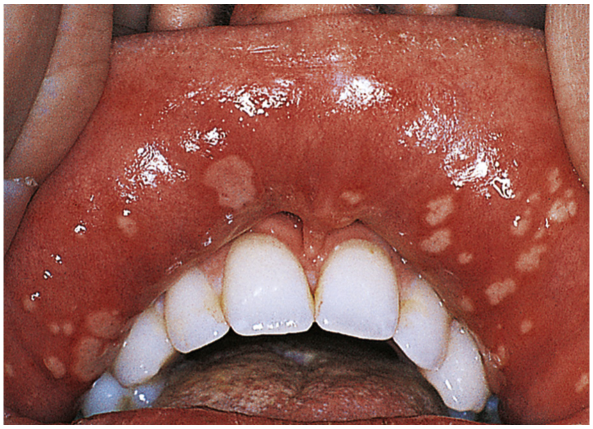

Fig. 8.7 Herpetiform ulcer. (From Cawson, R., et al. [2002]. *Essentials of oral pathology and oral medicine* [7th ed.]. London: Churchill Livingstone.)

Oral thrush

Oral thrush usually presents as creamy white, soft, elevated patches that are usually painless but can cause burning or irritation. Please see the next section on painless oral lesions for a fuller description of the signs and symptoms.

Primary herpetic gingivostomatitis

Caused by herpes simplex virus type 1, this is usually seen in children aged 2 to 5 years old. Infection results in ulceration of any part of the oral mucosa, especially the gums and buccal mucosa. The ulcers tend to be small and discrete and many in number. Before the eruption of ulcers, there are typically prodromal symptoms of fever, general malaise and headache. It is a self-limiting infection and usually resolves in 10 to 14 days.

Very unlikely causes

Erythema multiforme

Erythema multiforme (EM) is a skin reaction which is characterized by the appearance of distinctive targetlike lesions on the skin that can be accompanied by erosions of the oral or genital mucosa (or both). Oral lesions occur on the lips and anterior oral mucosa. The lesions present as asymmetrical, erythematous lesions. These lesions usually heal without scarring. Infection or drug therapy can precipitate EM, although in about 50% of cases, no cause can be found.

Stevens-Johnson syndrome or toxic epidermal necrolysis

These are rare, acute, serious and potentially fatal skin reactions in which there are sheetlike skin and mucosal loss. It is nearly always caused by medications, with antibiotics commonly implicated. Lip or mouth ulcers are prominent and can be severe.

Systemic lupus erythematosus

Cutaneous symptoms are common in systemic lupus erythematosus and can be the first signs in approximately 25% of people. In acute stages, a facial butterfly rash is often present. Other cutaneous symptoms are seen such as hair loss, blistering or maculopapular rashes and mucosal ulcers affecting the lips and mouth.

Systemic conditions

Behçet's disease

This is a multisystem disorder characterized by recurrent inflammatory skin lesions, eye problems (e.g., uveitis) and oral and genital ulcers. Eye symptoms and genital lesions are more prominent than skin and oral lesions. Oral ulcers can appear anywhere in the oral cavity and tend to be large (1–3 cm).

Coeliac disease and ulcerative colitis

These are associated with unexplained GI symptoms as predominant features. Coeliac disease is associated with diarrhoea, weight loss, abdominal pain and steatorrhoea. Unexplained fatigue (anaemia) and recurrent mouth ulcers can also occur.

In ulcerative colitis, bloody diarrhoea and abdominal pain are prominent. Fatigue, malaise and fever may also be present. Oral involvement is usually seen in people at the severe end of the spectrum.

Human immunodeficiency infection

Human immunodeficiency infection can cause a variety of oral ulcers, including severe necrotic ulcers affecting the buccal and pharyngeal mucosa. These ulcers are painful and can cause dysphagia.

Vitamin B_{12}, iron or folate deficiency

Anaemias tend to be insidious in onset with gradually progressive signs and symptoms. Common symptoms include fatigue, pale skin and shortness of breath. Less common symptoms include headache, dizziness, pruritus and ulcers, especially in the corners of the mouth.

Table 8.3 summarizes the findings for the common painful oral lesions and Fig. 8.8 will aid in the differentiation between serious and non-serious conditions.

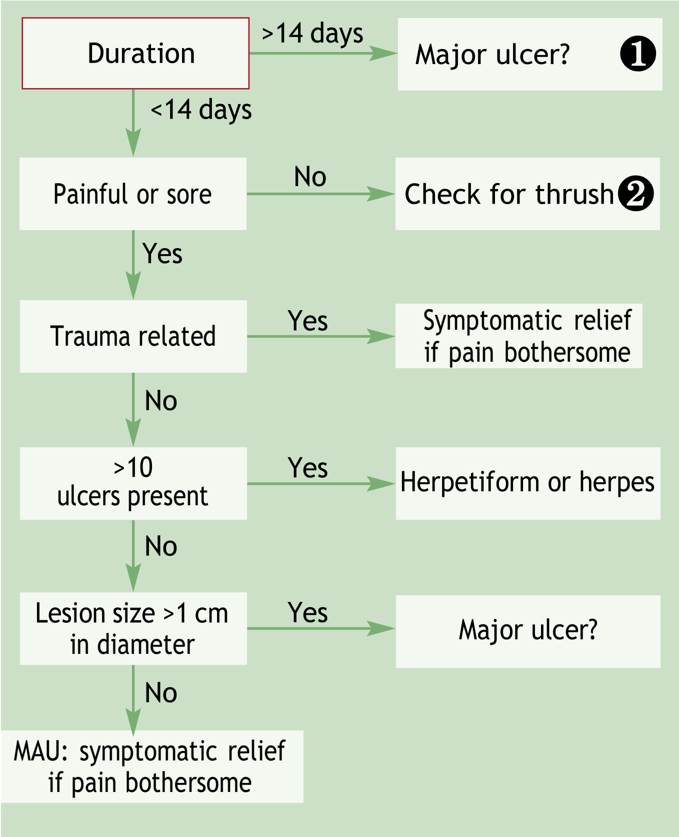

Fig. 8.8 Primer for the differential diagnosis of mouth ulcers.

❶ Duration. Minor aphthous ulcers normally resolve in 7 to 14 days. Ulcers that fail to heal within this time need referral to exclude other causes.

❷ Thrush. See Fig. 8.14 for the differential diagnosis of oral thrush. *MAU*, Minor aphthous ulcer.

Table 8.3
Condition summary of the commonest types of painful oral lesions

Condition	Number	Location	Size and shape	Age	Duration
Minor ulcers	Up to ~five ulcers	Lips, tongue and inside cheeks	<1 cm and round	10–40 years	5–10 days
Major ulcer	Numerous	Anywhere	Large, 1–3 cm (and of variable shape)	All ages	≤6 weeks
Trauma	Usually singular	Buccal mucosa, lower lip, tongue	Variable and jagged edges	All ages	7–10 days
Hand, foot and mouth disease	Variable	Commonly the tongue	Variable	Young children	7–10 days
Herpetiform	Very numerous	Back of the mouth	Pinpoint and round and can coalesce	All ages	1–2 weeks
Herpangina	Variable	Anywhere	1–2 mm	Young children	5–10 days
Herpetic gingivostomatitis	Variable	Anywhere	Small (2–5 mm)	Young children	10–14 days

Red flags indicative of referral: painful oral lesions

Reason for referral	Why referring	Timeframe for referral
• Duration >14 days • Systemic symptoms • Skin rash	• Suggests underlying pathology	• Urgent referral
• Pinpoint or large ulcers	• Suggests herpetiform ulcers, herpangina or major ulcers	• As soon as practicable
• Ulcers in crops of five or more	• Suggests herpetiform ulcers	
• Children younger than 10 years	• MAUs are unusual in young children and suggests herpangina or herpetic gingivostomatitis or HFMD	

Evidence base for over-the-counter medication

A wide range of products are used for the temporary relief and treatment of mouth ulcers. These products contain corticosteroids, local anaesthetics, antibacterials, astringents and antiseptics.

Corticosteroids

Topical corticosteroids are recommended as one of the mainstays of treatment for patients with MAU; however, most products are not available OTC in the United Kingdom.

Hydrocortisone mucoadhesive buccal tablets

Only one trial conducted by Truelove and Morris-Owen (1958) could be found. The authors recruited 52 patients with various forms of oral ulceration and found that 23 patients had MAUs. They stated that 22 of the 23 patients obtained rapid pain relief, and the healing rate of the ulcers was accelerated.

Antibacterial agents

Several randomized controlled trials have investigated antibacterial mouthwashes containing chlorhexidine gluconate. Data from some but not all studies have found that they may reduce the frequency and duration of recurrent ulcers and may reduce the pain and severity of each episode of ulceration. However, like topical corticosteroids, the evidence for antibacterial agents is of poor quality.

Products containing anaesthetic or analgesics

There is very little evidence to support the pain-relieving effect of anaesthetics or analgesics in MAUs. However, these preparations are clinically effective in other painful oral conditions, and it is therefore not unreasonable to expect some relief of symptoms when using these products. A small body of evidence exists specifically for choline salicylate and benzydamine.

Choline salicylate

Choline salicylate has been shown to exert an analgesic effect in a few small studies. However, only one study by Reedy (1970) involving 27 patients evaluated choline salicylate in the treatment of oral aphthous ulceration. No significant differences were found between choline salicylate and placebo in ulcer resolution, but choline salicylate was found to be significantly superior to placebo in relieving pain.

Benzydamine

Benzydamine mouthwash has been studied in a small, low-quality trial for its effect in managing recurrent aphthous stomatitis (Taylor, 2018). The study found that benzydamine was not significantly different from placebo in terms of ulcer severity or ulcer pain. However, nearly 50% of patients preferred benzydamine because of its transient topical analgesic effect.

Protectorants

Pastes that contain gelatin, pectin and carmellose sodium stick when in contact with wet mucosal surfaces. These have been advocated, but there is a paucity of data to support their efficacy.

Practical prescribing and product selection

Prescribing information relating to the medicines used for ulcers is reviewed in Table 8.4.

Hydrocortisone tablets

Each tablet contains 2.5 mg of hydrocortisone in the form of the ester hydrocortisone sodium succinate. The dosage for adults and children older than 12 years of age is one pellet to be dissolved near the ulcers four times a day for up to 5 days. It does not interact with any medicines, can be taken by all patient groups, has no side effects and appears to be safe in pregnancy and breastfeeding.

Antibacterial agents (chlorhexidine, e.g., Corsodyl)

Chlorhexidine mouthwash is indicated as an aid in the treatment and prevention of gingivitis and in the maintenance of oral hygiene, which includes the management of aphthous ulceration. Ten millilitres of the mouthwash should be rinsed around the mouth for about 1 minute twice a day. It can be used by all patient groups, including those who are pregnant and breastfeeding. Side effects associated with its use include reversible tongue and tooth discolouration, burning of the tongue, and taste disturbances.

Choline salicylate (Bonjela Cool Mint, Bonjela Gel)

Adults and children older than 16 years should apply using a clean finger over the ulcer every 3 hours when needed. It is a safe

Table 8.4
Practical prescribing: Summary of medicines for painful oral lesions

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Hydrocortisone	Older than 12 years	None	None	None	OK
Choline salicylate	Older than 16 years	None			
Lidocaine	Older than 7 years (Iglu)[a]	Can cause sensitization reactions			
Benzocaine	Older than 12 years				
Chlorhexidine		None			
Benzydamine		May cause stinging			

[a] Children younger than 10 years of age should not be given products routinely because ulcers are rare in this age group.

medicine and can be given to all patient groups. It is not known to interact with any medicines or cause any side effects.

Local anaesthetics (lidocaine, e.g., Anbesol range, Bonjela Junior Gel, Iglu Gel, Medijel and Benzocaine, Orajel range)

All local anaesthetics have a short duration of action; frequent dosing is therefore required to maintain the anaesthetic effect. They are thus best used on an as-needed basis, although the upper limit on the number of applications allowed varies, depending on the concentration of anaesthetic included in each product. They appear to be free from any drug interactions, have minimal side effects and can be given to all patient groups. A small percentage of patients might experience a hypersensitivity reaction with lidocaine or benzocaine and appears to be more common with benzocaine.

Benzydamine (Difflam)

The dosage for adults and children older than the age of 12 years every is 15 mL rinsed around the mouth every 1.5 to 3 hours when required. It occasionally causes stinging, in which case the rinse can be diluted with water.

Protectorants

These can be applied as frequently as required. They need to be applied after food because food is likely to rub off these products. There are no interactions, and they can be used in all patient groups.

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Websites

Behçet's UK. https://behcetsuk.org/
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Painless oral lesions

Background

Oral lesions that do not have pain as a prominent clinical feature tend to be cases of oropharyngeal candidiasis (oral thrush), although precancerous and cancerous lesions can be encountered, especially in older adults. This section therefore deals with oral thrush and its differential diagnosis.

Prevalence and epidemiology

It is reported that *Candida albicans* is found in the oral cavities of 30% to 60% of healthy people in developed countries (Gonsalves et al., 2007). The prevalence in denture wearers is even higher. The very young (neonates) and the very old are most likely to have oral thrush. It has been reported that 14% of infants at 4 weeks of age and 10% of debilitated older patients have oral thrush.

Table 8.5
Causes of painless oral lesions and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Oral thrush
Likely	• Erythema migrans (geographic tongue) • Hairy tongue
Unlikely	• Lichen planus
Very unlikely	• Leukoplakia • Squamous cell carcinoma

Aetiology

Candida is a yeast-like fungus which is part of the normal commensal flora of the human GI tract. Oral candidiasis is an opportunistic infection and occurs because of changes in the normal environment in the oral cavity, such as low pH and low oxygen levels, allowing *C. albicans* to proliferate. In healthy patients, the patient's immune system and normal bacteria flora inhibit *Candida* growth. It therefore tends to arise in a patient with one or more local or systemic predisposing factors.

Arriving at a differential diagnosis

Oral thrush is not difficult to diagnose, and the role of the pharmacist is to eliminate underlying pathology and exclude risk factors. A number of other conditions need to be considered (Table 8.5), and asking a number of specific questions will help to establish a differential diagnosis (Table 8.6). After questioning, the pharmacist should inspect the oral cavity to help confirm the diagnosis.

Clinical features of oral thrush

The classic presentation of oral thrush is with creamy white, soft, elevated patches that can be wiped off, revealing underlying erythematous mucosa (Fig. 8.9). It is usually symptomless but can cause burning or irritation. Lesions can occur anywhere in the oral cavity but usually affect the tongue, palate, lips and cheeks. Patients sometimes complain of malaise and loss of appetite. In neonates, spontaneous resolution can occur but can take a few weeks.

Conditions to eliminate

Likely causes

Erythema migrans (geographic tongue)

Tongue lesions exhibit central erythema usually surrounded by slightly elevated white to yellow borders, thus giving the appearance of continents surrounded by water (e.g., geographic tongue). The appearance changes over several days demonstrating a 'migrating pattern' (Fig. 8.10). It is usually asymptomatic, but some patients may complain of pain or burning, especially when eating spicy foods. It usually resolves without treatment, but symptoms can be treated with anaesthetics or mouthwashes.

Table 8.6
Specific questions to ask the patient: Painless oral lesions

Question	Relevance
Size, shape and look of lesion	• Typically, oral thrush and leukoplakia present as solid patches. They tend to be irregularly shaped and vary in size from small to large. • Lichen planus shows a lacelike appearance.
Associated symptoms	• Thrush can cause some discomfort, especially if the white patch is rubbed off to leave the erythematous skin exposed. • Painless patches, especially in people older than 50 years of age, could indicate sinister pathology, such as leukoplakia.
Location of lesions	• Oral thrush can affect all areas of the oral cavity. • Lichen planus tends to be on the buccal mucosa and rarely on the tongue.
Risk factors for *Candida* infection	It is associated with underlying pathology such as: • Diabetes • Patients who are immunocompromised • Xerostomia (dry mouth) It can also be precipitated by: • Chemotherapy • Denture wearing • Inhaled corticosteroids • Poor oral hygiene • Recent antibiotic therapy

Hairy tongue

Hairy tongue occurs most often in heavy smokers but is also associated with poor oral hygiene. It is usually asymptomatic with the top of the tongue having an abnormal coating, appearing in various colours, causing a hairlike appearance. Occasionally, patients may complain of a burning or tickling sensation on the tongue. Halitosis might be present.

Unlikely cause

Lichen planus

Oral lichen planus is a mucosal presentation of lichen planus that has a variety of clinical subtypes, with each subtype having a different clinical appearance. The reticular type (most common) is characterized by interlacing white lines that produce a 'netlike' pattern (Wickham's striae) (Fig. 8.11). This is most commonly located on the buccal mucosa but can be found on the tongue and lip.

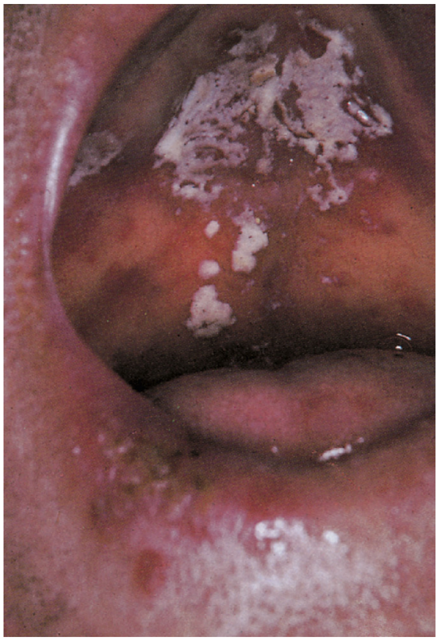

Fig. 8.9 Oral candidiasis. (From Forbes, C. D., & Jackson, W. F. [2004). *Illustrated pocket guide to clinical medicine* [2nd ed.]. St Louis: Mosby.

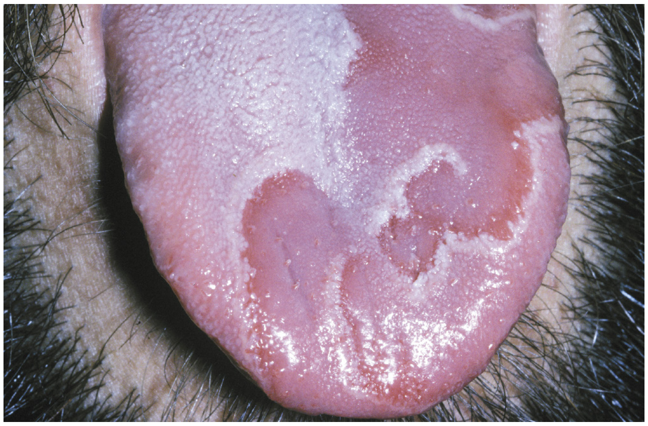

Fig. 8.10 Geographic tongue. (Source: *Oral and maxillofacial pathology* [5th ed.]. 2024.)

Very unlikely causes

Leukoplakia

Patients present with a symptomless white patch mainly on the buccal mucosa but also on the tongue, which develops over a period of weeks (Figs. 8.12 and 8.13). The lesion cannot be wiped off, unlike oral thrush. Most cases are seen in people older than the age of 40 and is more common in males. It is often associated with smoking and is a precancerous lesion, although epidemiologic data have suggested that the annual transformation rate to squamous cell carcinoma is approximately 1%.

Oral carcinoma

Globally and in the United Kingdom, the incidence of oral cancers has been increasing. In 2021, nearly 9000 cases of oral cancer in the United Kingdom were confirmed, with more than 3000 deaths. The 10-year survival rate is between 18% to 57% and depends on its location and how early it is diagnosed.

More than two-thirds (67%) of all patients with mouth cancer are male, and its incidence is strongly related to age. Incidence rates increase sharply beyond 45 years, and 75% of cases are diagnosed

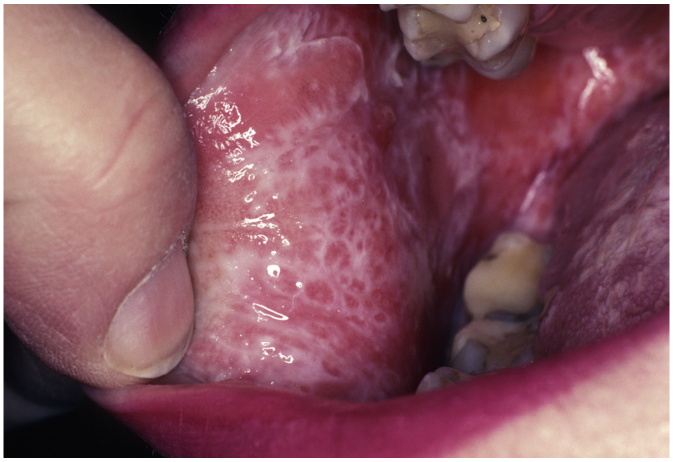

Fig. 8.11 Lichen Planus. (From Forbes, C. D., & Jackson, W. F. [2004]. *Illustrated pocket guide to clinical medicine* [2nd ed.]. St Louis: Mosby.)

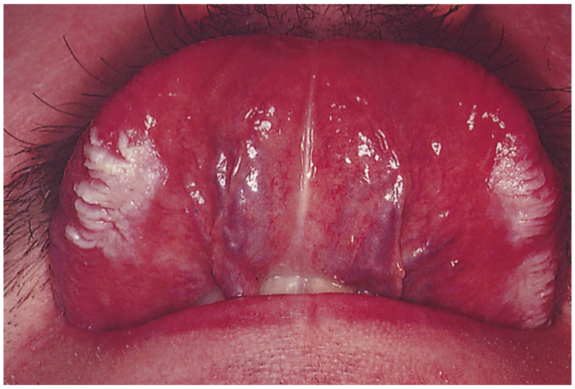

Fig. 8.12 Leukoplakia. (From Forbes, C. D., & Jackson, W. F. [2004]. *Illustrated pocket guide to clinical medicine* [2nd ed.]. St Louis: Mosby.)

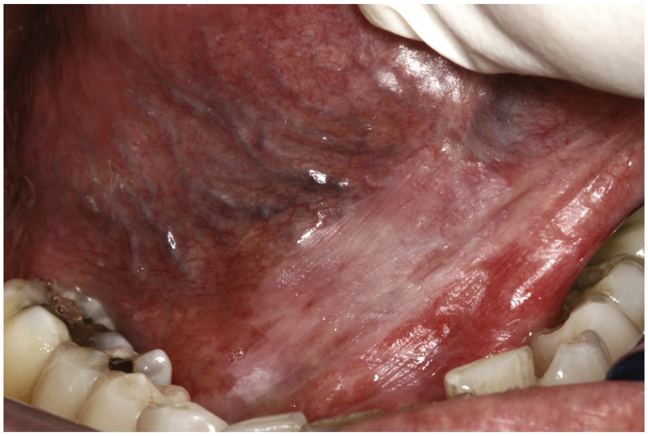

Fig. 8.13 Leukoplakia. (Source: *Oral and maxillofacial pathology* [5th ed.]. 2024.)

in those older than 55 years. Smoking and excessive alcohol consumption are known risk factors in developing oral cancer.

Almost 60% of cases affect the tongue (32%) or tonsils (26%), although it can occur in any part of the mouth (e.g., floor of mouth [7%], gums [5%], palate [5%]). Initial presentation ranges from painless spots, lumps or ulcers in the mouth or lip area that fail to resolve. Over time, these become painful, change colour, crust over or bleed. The painless nature of early symptoms leads people to seek help only when other symptoms become apparent. Symptoms therefore can be present for a number of weeks before the patient sees a healthcare practitioner. Any solitary ulcer of longer than 3 weeks in duration should be viewed with caution.

Fig. 8.14 will aid the differentiation of thrush from other oral lesions.

Red flags indicative of referral: Painless oral lesions

Reason for referral	Why referring	Timeframe for referral
• Long standing lesions	• Potential sinister pathology	• As soon as practicable
• Immunocompromised patients	• Likely to have severe and extensive involvement	• Urgent same-day referral
• Extensive or severe infection	• Need for systemic antifungals	

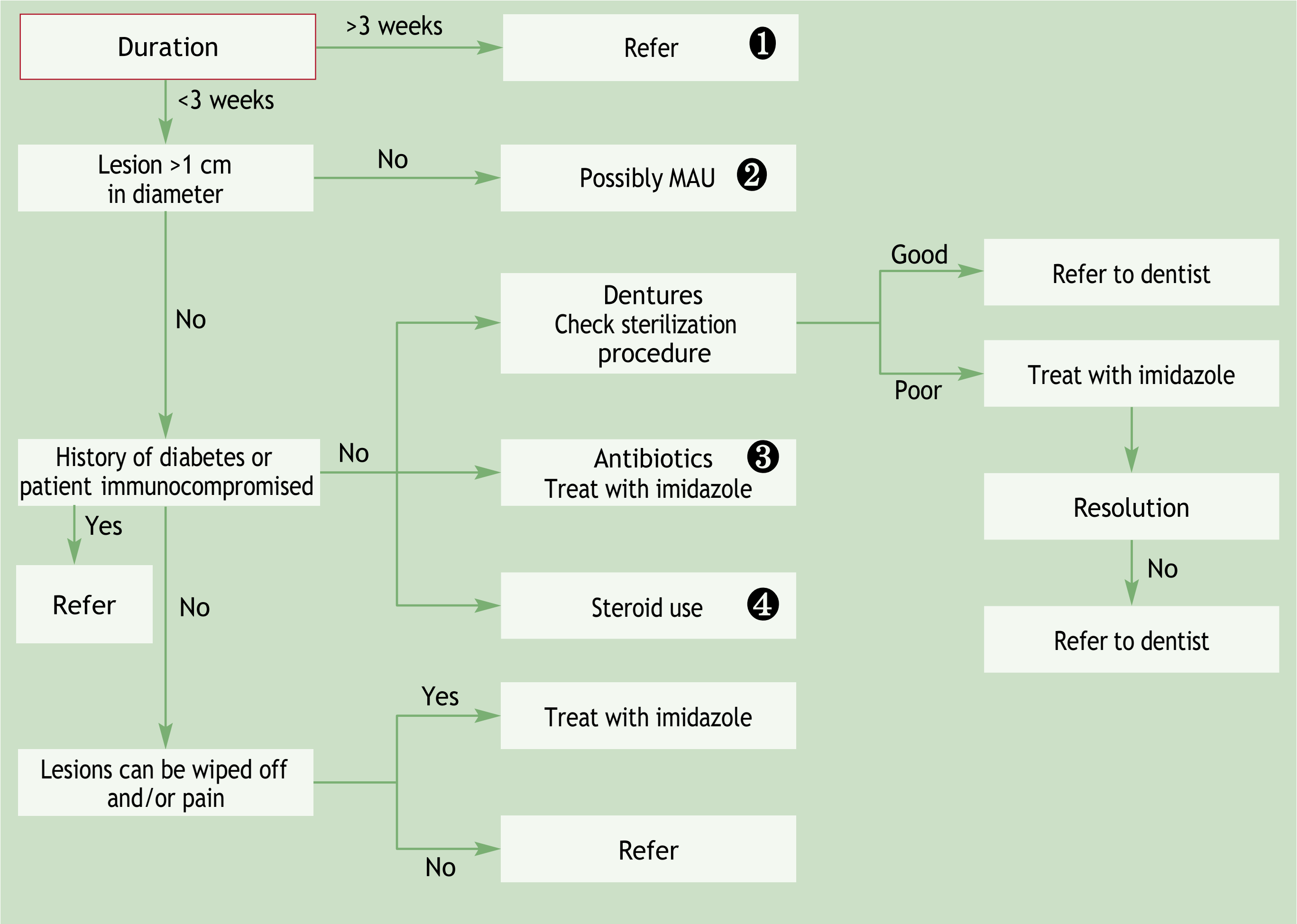
Duration
>3 weeks
Refer ❶
<3 weeks
Lesion >1 cm in diameter
No
Possibly MAU ❷
No
Dentures Check sterilization procedure
Good
Refer to dentist
Poor
Treat with imidazole
History of diabetes or patient immunocompromised
No
Antibiotics ❸ Treat with imidazole
Yes
Refer
No
Steroid use ❹
Resolution
No
Refer to dentist
Yes
Treat with imidazole
Lesions can be wiped off and/or pain
No
Refer

Fig. 8.14 Primer for the differential diagnosis of oral thrush.

❶ Duration. Any lesion lasting more than 3 weeks must be viewed with caution.

❷ See Fig. 8.8 for a primer on the differential diagnosis of mouth ulcers.

❸ Antibiotics. Broad-spectrum antibiotics, such as amoxicillin and macrolides, can precipitate oral thrush by altering the normal flora of the oral cavity.

❹ Inhaled corticosteroids. High-dose inhaled corticosteroids can cause oral thrush. Patients should be encouraged to use a spacer and wash out their mouths after inhaler use to minimize this problem.

Table 8.7
Practical prescribing: Daktarin

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Daktarin	Older than 4 months (unlicensed for infants younger than 4 months, but Clinical Knowledge Summaries advocate its use by general practitioners)	Nausea and vomiting, dry mouth	Warfarin	None	OK

HINTS AND TIPS BOX 8.1: ORAL THRUSH

Dentures and thrush

- Denture-associated candida is most often diagnosed on the hard palate. This presentation is often asymptomatic, but a bright red area that corresponds to the area of the denture will be seen.
- Initial treatment focuses on improvement of oral and denture hygiene as well as removal of the denture during sleep.
- Dentures should be cleaned by brushing and soaking in a disinfectant solution.
- If miconazole is used, then dentures should be brushed with the gel.

Evidence base for over-the-counter medication

Only Daktarin oral gel (miconazole) is available OTC to treat oral thrush. It has proven efficacy and appears to have clinical cure rates between 80% and 90%. In comparative trials, Daktarin appears to have superior cure rates than the prescription-only medication (POM) nystatin (Hoppe, 1997; Hoppe & Hahn 1996).

Practical prescribing and product selection

Prescribing information relating to Daktarin Oral gel is discussed and summarized in Table 8.7; useful tips relating to thrush are given in 'Hints and tips' in Box 8.1.

Miconazole (Daktarin oral gel)

The dosage of the gel is four times a day in all age groups. For those aged between 4 and 24 months, 1.25 mL (¼ measuring spoon) of gel should be applied; for adults and children older than 2 years, 2.5 mL (½ measuring spoon) of gel is applied. Patients should be advised to hold the gel in the mouth for as long as possible to increase contact time between the medicine and the infection. The gel is flavoured orange to make retention in the mouth more acceptable to patients. Treatment should be continued for up to 7 days after the symptoms have cleared to prevent relapse and reinfection. It can cause nausea and vomiting, dry mouth and oral discomfort.

Miconazole can inhibit the metabolism of drugs metabolized by the CYP3A4 and CYP2C9 enzyme systems. The manufacturers state that it can interact with various medicines, namely mizolastine, cisapride, triazolam, midazolam, quinidine, pimozide, sertindole, ergot alkaloids, HMG-CoA reductase inhibitors (statins) and anticoagulants. However, there is a lack of published data to determine how clinically significant these interactions are except with warfarin. Coadministration of warfarin with miconazole increases warfarin levels markedly, and the patient's international normalized ratio should be monitored closely. The manufacturers advise that Daktarin should be avoided in pregnancy, but published data do not support an association between miconazole and congenital defects. It appears to be safe to use while breastfeeding.

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Gingivitis

Background

Gingivitis simply means inflammation of the gingival tissue. It is mostly caused by bacterial infection and results from an excess buildup of plaque on the teeth. The condition is entirely preventable if regular and correct toothbrushing is undertaken.

Prevalence and epidemiology

It is estimated 50% of the UK population is affected by gum disease, and more than 85% of people older than 40 years will experience gingival disease. Males are affected slightly more than females, and the condition seems to be linked to females following better oral hygiene. Gingivitis is more prevalent in people with low socioeconomic status. It is more prevalent in pregnant females, who also experience more severe forms of gingivitis.

Aetiology

After toothbrushing, the teeth soon become coated in a mixture of saliva and gingival fluid, known as pellicle. Oral bacteria and food particles adhere to this coating and begin to proliferate, forming plaque; subsequent brushing of the teeth removes this plaque buildup. However, if plaque is allowed to build up for 3 or 4 days, bacteria begin to undergo internal calcification, producing calcium phosphate, better known as tartar (or calculus). This adheres tightly to the surface of the tooth and retains bacteria in situ. The bacteria release enzymes and toxins that invade the gingival mucosa, causing inflammation of the gingiva (gingivitis). If the plaque is not removed, the inflammation travels downwards, involving the periodontal ligament and associated tooth structures (periodontitis). A pocket forms between the tooth and gum, and over a period of years, the root of the tooth and bone are eroded until the tooth becomes loose and is lost. This is the main cause of tooth loss in people older than 40 years of age.

Risk factors are associated with gingivitis and periodontitis; these include diabetes mellitus, cigarette smoking, poor nutritional status and poor oral hygiene. Some local factors can contribute to the formation of plaque, such as crowding of teeth in which plaque removal becomes difficult.

Arriving at a differential diagnosis

A number of conditions other than gingivitis need to be considered (Table 8.8), and asking a number of specific questions helps to establish a differential diagnosis (Table 8.9). The mouth should be inspected for telltale signs of gingival inflammation of swollen red or bleeding gums.

Clinical features of gingivitis

Gingivitis seldom causes spontaneous bleeding and is commonly painless; therefore, many patients do not recognize the disease and fail to seek attention. Gingivitis is characterized by swelling and reddening of the gums, which bleed easily with trauma (e.g., when brushing teeth). Plaque might be visible, especially on teeth that are difficult to reach when toothbrushing. Halitosis might also be present.

Table 8.8
Causes of gum bleeding and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	Gingivitis
Likely	Periodontitis
Very unlikely	Leukaemia Lichen planus Platelet disorders

Table 8.9
Specific questions to ask the patient: Gingivitis

Question	Relevance
Dental history	Establish the frequency of toothbrushing and visits to the dentist. Poor oral hygiene is a key factor in developing gingivitis.
Toothbrushing technique	Overzealous toothbrushing can lead to bleeding gums and gum recession. Make sure the patient is not 'overcleaning' their teeth.
Bleeding gums	Excessive toothbrushing can lead to trauma and bleeding. Bleeding with gentle probing is a sign of gingivitis. Spontaneous bleeding suggests periodontitis or more sinister causes.

Conditions to eliminate

Likely cause

Periodontitis

The most common complication of gingivitis is the progression of inflammation towards the underlying tissue and bone, resulting in periodontitis. Symptoms are similar to those of gingivitis, but the patient will experience spontaneous bleeding, taste disturbances, halitosis and difficulty while eating. Periodontal pockets might be visible, and the patient might complain of loose teeth.

Unlikely cause

Medicine-induced gum bleeding

Medicines such as warfarin, heparin and NSAIDs might produce gum bleeding. Gum hypertrophy is associated with phenytoin, ciclosporin and calcium channel blockers.

Very unlikely causes

Leukaemia

Apart from gingival enlargement and spontaneous bleeding, other associated features include oral ulceration, petechiae (pinpoint round spots), herpetic infections and candidiasis.

Oral lichen planus

This is characterized by white patches usually on the cheeks, tongue and gums. Occasionally, it can cause gingival redness and soreness.

Platelet disorders

Symptoms of platelet disorders show gingival enlargement and spontaneous bleeding but commonly exhibit bleeding and bruising elsewhere (e.g., bruising from minor trauma and nosebleeds).

Red flags indicative of referral: Gingivitis

Reason for referral	Why referring	Timeframe for referral
Foul taste associated with gum bleeding	Suspect periodontitis	As soon as practicable to a dentist
Signs of bleeding and bruising other than gum bleeding	Suspect sinister pathology	Urgent same-day referral

Evidence base for over-the-counter medication

Put simply, there is no substitute for good oral hygiene. Prevention of plaque buildup is the key to healthy gums and teeth. Twice-daily brushing for 2 minutes with a fluoride toothpaste is recommended to maintain oral hygiene and prevent tooth decay. Daily interdental cleaning with floss or interdental brushes has also been shown to be more effective than toothbrushing alone. There is also some evidence to suggest brushes are more effective than floss (Worthington et al., 2019). Ideally, powered toothbrushes (with rotation oscillation action, in which the brush heads rotate in one direction and then in the opposite direction) should be used because they are more effective than manual brushing for plaque removal (Yaacob et al., 2014).

There is a plethora of oral hygiene products marketed to the public. Mouthwashes contain chlorhexidine, hexetidine and hydrogen peroxide. Of these, chlorhexidine has high-quality evidence for reducing dental plaque and gingivitis regardless of its concentration (James et al., 2017).

Practical prescribing and product selection

Prescribing information relating to the medicines used for gingivitis is discussed and summarized in Table 8.10; useful tips relating to products for oral care are given in 'Hints and tips' in Box 8.2.

All mouthwashes have minimal side effects and can be used by all patient groups. They are rinsed around the mouth for 30 to 60 seconds and spat out.

Chlorhexidine gluconate mouthwash (e.g., Corsodyl)

This is suitable for adults and children older than 12 years, with a standard dose of 10 mL twice a day. Although chlorhexidine is free from side effects, patients should be warned that prolonged use (>4 weeks) may stain the tongue and brown the teeth. This can be reduced or removed by brushing the teeth before use. If this fails to remove

Table 8.10
Practical prescribing: Summary of medicines for gingivitis

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Chlorhexidine	Older than 12 years[a]	Staining of the teeth and tongue; mild irritation	None	None	OK
Hexetidine	Older than 6 years[a]	Mild irritation or numbness of the tongue			
Hydrogen peroxide		None			

[a]Children are best referred to a dentist.

HINTS AND TIPS BOX 8.2: TOOTH PROTECTION

Dental flossing	A piece of floss about 20 cm long should be wrapped around the ends of the middle fingers of each hand, leaving 5–8 cm between the first finger and thumb. The floss should be placed between two teeth and curved into a C shape around one tooth, slid up between the gum and tooth until resistance is felt and then moved vertically up and down several times to remove plaque.
Using fluoride	Individuals who are either particularly prone to caries or are medically compromised may be given additional protection. Public Health England recommends the daily use of a fluoride mouthwash in adults and children aged 7 years and older.
Fluoride toothpaste	Advise people to 'spit don't rinse' when cleaning their teeth.

the staining, it can be removed by a dentist. It is also available in spray and gel formulations for adults and children older than 12 years.

Hexetidine (Oraldene)

Adults and children older than 6 years should use a 15-mL dose two or three times a day.

Hydrogen peroxide (e.g., Peroxyl)

Adults and children older than 6 years should use 10 mL up to four times a day. It can cause mucosal irritation but is rare.

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British Dental Association. https://www.bda.org
British Fluoridation Society. https://www.bfsweb.org
Oral Health Foundation. https://www.dentalhealth.org/

Dyspepsia

Background

Dyspepsia refers to a wide range of upper abdominal symptoms, which include abdominal pain or discomfort, heartburn, acid reflux, nausea or vomiting. People presenting for the first time or without a prior medical diagnosis are said to have uninvestigated dyspepsia (i.e., those who have not had endoscopic investigation). Symptoms can be managed in a pharmacy setting, but when they persist, onward referral to a general practitioner (GP) is needed to conduct further tests. These include establishing *Helicobacter pylori* infection or endoscopy for peptic ulcers, malignancy or oesophagitis. If infection is ruled out and endoscopic investigation is normal, then the term *functional dyspepsia or non-ulcer dyspepsia* is used to define symptoms.

Prevalence and epidemiology

The exact prevalence of dyspepsia is unknown. This is largely because of the number of people who self-medicate or do not report mild symptoms to their doctors. However, dyspepsia is extremely common. Between 25% and 40% of the general population in the West are reported to have dyspepsia symptoms each year. Prevalence increases with age and has been reported to be slightly higher in females than in males.

Aetiology

The aetiology of dyspepsia symptoms differs depending on the cause. Decreased muscle tone leads to lower oesophageal sphincter incompetence (often because of medicines or overeating) and is the principal cause of gastro-oesophageal reflux disease (GORD). Increased acid production results in inflammation of the stomach (gastritis) and is usually attributable to *H. pylori* infection or acute alcohol indigestion. The presence of *H. pylori* is central to duodenal and gastric ulceration; *H. pylori* is present in 90% to 95% of duodenal ulcers and 70% to 90% of gastric ulcers. The exact mechanism whereby it causes ulceration is still unclear, but the bacteria produce toxins that stimulate the inflammatory cascade. Functional dyspepsia is thought to be multifactorial, with delayed gastric emptying, inflammation and infection all contributing to symptoms. In addition, psychological factors, such as anxiety and stress, can precipitate symptoms.

Arriving at a differential diagnosis

Overwhelmingly, patients who present in a community pharmacy with symptoms of abdominal discomfort, heartburn or reflux are likely to have GORD or dyspepsia (Table 8.11).

A number of dyspepsia-specific questions should be asked to help establish a differential diagnosis (Table 8.12).

Table 8.11
Causes of upper gastrointestinal symptoms and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Dyspepsia
Likely	• Gastro-oesophageal reflux disease
Unlikely	• Biliary disease • Hepatitis • Irritable bowel syndrome • Medicine induced • Pancreatitis (acute and mild) • Peptic ulcers • Splenic enlargement
Very unlikely	• Abdominal wall tear • Atypical angina • Malignancy • Myocardial infarction • Perforated ulcer

Clinical features of dyspepsia and gastro-oesophageal reflux disease

Patients present with a range of symptoms that commonly involve vague abdominal discomfort (aching) above the umbilicus associated with belching or bloating, flatulence, a feeling of fullness, nausea or vomiting and heartburn. Although dyspeptic symptoms are a poor predictor of disease severity or underlying pathology, retrosternal heartburn is the classic symptom of GORD.

Conditions to eliminate

Unlikely causes

Biliary colic

This typically presents with sudden persistent colicky and severe epigastric pain. Pain usually lasts 30 minutes but can last hours but at a lower intensity; it starts a few hours after a meal, frequently awakening the patient in the early hours of the morning. The pain can radiate to the tip of the right scapula or back. Fatty foods often aggravate the pain. Nausea and vomiting are common. The incidence increases with increasing age and is most common in people older than 50 years. It is also more prevalent in females than in males.

Hepatitis

Dull right upper quadrant pain is associated with general malaise, fever, fatigue, nausea, dark urine, pale stools and yellowing of the skin.

Irritable bowel syndrome

Patients younger than 50 years who have uncomplicated dyspepsia, lower abdominal pain and altered bowel habits may have irritable bowel syndrome (IBS). For further details on IBS, see later in this chapter.

Table 8.12
Specific questions to ask the patient: Dyspepsia

Question	Relevance
Age	• Young adults are likely to have dyspepsia with no specific pathology. • In adults older than 50 years of age, a specific pathological condition becomes more common.
Location	• Dyspepsia is experienced as pain above the umbilicus and centrally located (epigastric area). • Pain experienced behind the sternum (heartburn) is likely to be caused by GORD. • IBS tends to have left lower quadrant pain predominant rather than epigastric pain.
Nature of pain	• Pain associated with dyspepsia is described as aching or discomfort. • Pain described as gnawing, sharp or stabbing is more likely to be ulcer related. • Severe pain may indicate cardiovascular or musculoskeletal in origin.
Radiation	• Pain felt down the inside aspect of the left arm might be cardiovascular in origin. • Pain felt at the tip of the scapula might be biliary in origin.
Associated symptoms	• Fever can suggest hepatitis, pancreatitis or splenic enlargement. • General malaise is associated with cardiovascular causes and hepatitis.
Social history	• Bouts of excessive drinking are commonly implicated in dyspepsia. • Eating food on the move or too quickly often precipitates symptoms.
Risk factors for GORD	• Stress, smoking, being overweight and taking medicines that decrease lower oesophageal sphincter tone.

GORD, Gastro-oesophageal reflux disease; *IBS,* irritable bowel syndrome.

Medicine-induced dyspepsia

Medicines can cause gastric irritation, leading to or provoking GI discomfort, or they can decrease lower oesophageal sphincter tone, resulting in reflux. Aspirin and NSAIDs are often associated with dyspepsia and can affect up to 25% of patients. Table 8.13 lists other medicines commonly implicated in causing dyspepsia.

Pancreatitis

A mild attack can present with steady epigastric pain that can radiate to the back. Patents generally have fever, nausea or vomiting

Table 8.13
Medicines that commonly cause dyspepsia or abdominal discomfort

Acarbose (1–10%)
Antibiotics (e.g., macrolides, tetracyclines)
Anticoagulants
Angiotensin-converting enzyme inhibitors
Alcohol (in excess)
Bisphosphonates
Calcium antagonists
Iron
Metformin
Metronidazole
Nitrates
Oestrogens
Orlistat (>10%)
Potassium supplements
Selective serotonin reuptake inhibitors
Sildenafil (1–10%)
Steroids
Theophylline

with associated abdominal tenderness and an elevated heart rate. It is commonly seen in those who misuse alcohol (25% of cases) or have gallstones (50% of cases).

Peptic ulceration

Ruling out peptic ulceration is probably the main consideration when assessing patients with symptoms of dyspepsia. Ulcers are categorized as gastric or duodenal. Typically, the patient has well-localized, midepigastric pain described as constant, annoying, gnawing or boring. In gastric ulcers, the pain is usually triggered by food (and not relieved by antacids) and experienced shortly after eating. In duodenal ulcers, the pain occurs 2 to 5 hours after meals, which is relieved by food and often awakens the person at night. Gastric ulcers are also more commonly associated with weight loss and GI bleeds than duodenal ulcers. Patients can experience weight loss of 5 to 10 kg, and although this could indicate malignancy, especially in people older than 40 years, a benign gastric ulcer is found most of the time on investigation. NSAID use is associated with a three- to fourfold increase in gastric ulcers. The peak incidence of duodenal ulcers is between 45 and 64 years, whereas the incidence of gastric ulcers increases with age (usually between 50 and 70 years old).

Splenic enlargement

Often asymptomatic but sometimes, this causes symptoms of left upper abdominal pain or discomfort associated with a feeling of fullness without eating or after eating small amounts of food. Anaemia, fever and weight loss may be present.

Very unlikely causes

Abdominal wall tear

Pain, which can be severe, is experienced generally after strenuous activity. Pain is exacerbated when stretching the muscles.

Atypical angina

Not all cases of angina have the classic textbook presentation of pain in the retrosternal area with radiation to the neck, back or left shoulder that is precipitated by temperature changes or exercise. Patients can complain of dyspepsia-like symptoms and generally feel unwell. These symptoms might be brought on by a heavy meal. In such cases, antacids fail to relieve symptoms.

Malignancy

Gastric carcinoma

Gastric carcinoma is the third most common GI malignancy after colorectal and pancreatic cancers. However, only 2% of patients who are referred by their GPs for an endoscopy have malignancy. Early symptoms of stomach cancer include persistent pain, dyspepsia-like symptoms, loss of appetite and fatigue. As the cancer becomes more advanced, other symptoms of unexplained weight loss, dysphagia, vomiting, melaena, anaemia and jaundice are experienced. Typically, ulcers affect people aged older than 65 years of age.

Oesophageal carcinoma

In its early stages, oesophageal carcinoma might go unnoticed. Over time, however, because the oesophagus becomes constricted, patients complain of difficulty in swallowing and experience a sensation of food sticking in the oesophagus. As the disease progresses, weight loss becomes prominent, and anaemia may occur.

Myocardial infarction

Classic symptoms are severe chest pain, which travels to the neck and left arm, shortness of breath, sweating, anxiety and nausea or vomiting. However, upper abdominal pain can be the presenting symptom.

Perforated ulcer

A complication of a peptic ulcer is perforation. Symptom presentation of perforation is sudden severe epigastric pain, but pain can become more generalized, including the right lower quadrant. Nausea or vomiting, lightheadedness and lack of appetite may also be present. A previous history of peptic ulcer symptoms is present. Typically, ulcers affect people aged older than 45 years of age.

Other conditions

Coeliac disease, lactose intolerance and Crohn's disease can exhibit dyspepsia-like symptoms, although these are not the major presenting symptoms. Symptoms such as diarrhoea are much more prominent.

Fig. 8.15 will aid in the differentiation of the causes of dyspepsia.

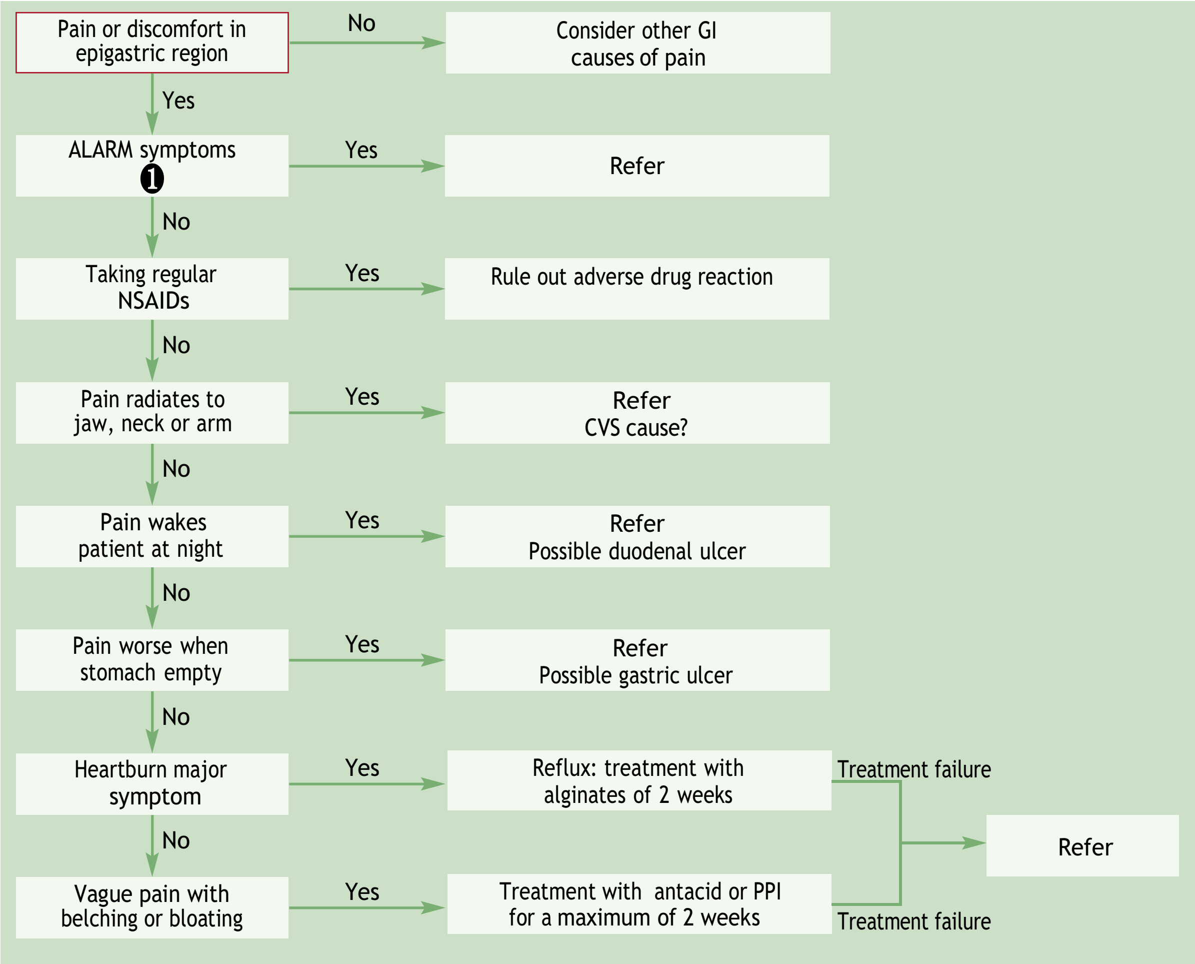
Pain or discomfort in epigastric region
No
Consider other GI causes of pain
Yes
ALARM symptoms ❶
Yes
Refer
No
Taking regular NSAIDs
Yes
Rule out adverse drug reaction
No
Pain radiates to jaw, neck or arm
Yes
Refer CVS cause?
No
Pain wakes patient at night
Yes
Refer Possible duodenal ulcer
No
Pain worse when stomach empty
Yes
Refer Possible gastric ulcer
No
Heartburn major symptom
Yes
Reflux: treatment with alginates of 2 weeks
Treatment failure
Refer
No
Vague pain with belching or bloating
Yes
Treatment with antacid or PPI for a maximum of 2 weeks
Treatment failure

Fig. 8.15 Primer for the differential diagnosis of dyspepsia.

❶ ALARM symptoms. These include anaemia (signs can include tiredness and pale complexion), loss of weight, anorexia, dark stools, difficulty in swallowing and vomiting blood. *CVS*, Cardiovascular; *GI*, gastrointestinal; *NSAID*, non-steroidal anti-inflammatory drug; *PPI*, proton pump inhibitor.

Red flags indicative of referral: Dyspepsia

Reason for referral	Why referring	Timeframe for referral
ALARM signs and symptoms **A**naemia (signs include tiredness, pale complexion, shortness of breath) **L**oss of weight **A**norexia **R**ecent onset of progressive symptoms **M**elaena, dysphagia, and haematemesis	Symptoms require further investigation	Urgent referral to GP
Referred pain	Suggests cardiovascular or biliary cause	
Severe pain	Suggests abdominal tear, perforated ulcer, cardiovascular or biliary cause	
Pain that wakes the patient at night	Suggests ulceration	As soon as practicable

Evidence base for over-the-counter medication

The National Institute for Health and Care Excellence (NICE) has issued guidance on the management of dyspepsia and GORD in adults in primary care (2014). These guidelines have specific information on pharmacist management of dyspepsia, and specific reference is made to this guidance. In accordance with NICE guidelines, the group of patients that should be treated by pharmacists are classed as having 'uninvestigated dyspepsia'. OTC treatment options consist of antacids, H_2 antagonists, alginates and proton pump inhibitors (PPIs).

Antacids

Antacids have been used for many decades to treat patients with dyspepsia and have proven efficacy in neutralizing stomach acid. However, the neutralizing capacity of each antacid varies, depending on the metal salt used.

Alginates

Alginate products are promoted as first-line treatment for patients with GORD. When in contact with gastric acid, the alginate precipitates out, forming a spongelike matrix that floats on top of the stomach contents. Alginate preparations are also commonly combined with antacids to help neutralize stomach acid. In clinical trials, alginate-containing products have demonstrated superior symptom control compared with placebo and antacids, although the evidence of greater efficacy is limited.

H_2 antagonists

Just ranitidine is currently marketed as an OTC product in the United Kingdom. The inhibitory effects of OTC doses of ranitidine on gastric acid have been investigated in healthy volunteers. Trials showed conclusively that ranitidine and its comparator drug famotidine significantly increased intragastric pH compared with placebo, although antacids (calcium carbonates) had a significantly quicker onset of action but with shorter duration.

Proton pump inhibitors

Several trials have compared PPIs with H_2 antagonists for non-ulcer dyspepsia and GORD-like symptoms (Pinto-Sanchez et al., 2017; Sigterman et al., 2013; Talley et al., 2002). Results indicate that PPIs, even at half the standard POM dose, are generally superior to H_2 antagonists in treating patients' dyspeptic symptoms.

Summary

Antacids work for most people presenting at the pharmacy with mild dyspeptic symptoms. They can be used as first-line therapy unless heartburn predominates; then an alginate or alginate–antacid combination can be used. H_2 antagonists appear to be equally as effective as antacids. PPIs are most effective and could be considered first-line treatment, especially for patients with moderate to severe or recurrent symptoms.

Practical prescribing and product selection

Prescribing information relating to the medicines used for dyspepsia is discussed and summarized in Table 8.14; useful tips relating to antacids are given in 'Hints and tips' in Box 8.3. A small number of products are licensed for children younger than 16 years of age but should not be recommended because dyspepsia symptoms in children are uncommon.

Table 8.14
Practical prescribing: Summary of medicines for dyspepsia

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Antacids					
Sodium only	Older than 12 years	None	None	Patients with heart disease	OK
Calcium only		Constipation	Tetracyclines, quinolones, imidazoles, phenytoin, penicillamine and bisphosphonates	None	
Magnesium only		Diarrhoea			
Aluminum only		Constipation			
Alginates	Older than 12 years	None	None	Patients with heart disease	
Ranitidine	Older than 16 years			None	
Proton pump inhibitors					
Omeprazole, esomeprazole, pantoprazole	Older than 18 years	Headache, diarrhoea, constipation, nausea and vomiting, abdominal pain; plus, fatigue with pantoprazole	Azole antifungals, clopidogrel, diazepam, fluvoxamine, cilostazol, atazanavir	None	OK, but some manufacturers advise caution or avoidance

HINTS AND TIPS BOX 8.3: ANTACIDS

Type of formulation	• Ideally, antacids should be given in the liquid form because the acid-neutralizing capacity and speed of onset are greater than those of tablet formulations.
Overuse of antacids	• Antacid therapy should ideally not be longer than 2 weeks. If symptoms have not resolved in this time, other treatments or evaluation from the GP should be recommended.
Sodium content	Be aware that some antacid preparations contain significant amounts of sodium e.g., Gaviscon Advance contains 4.6 mmol of sodium/10 mL. The specialist pharmacy service has produced a document detailing medicines with high sodium content (https://www.sps.nhs.uk/articles/sodium-content-of-medicines-for-indigestion-and-gastric-disorders/#:~:text=sodium%20content%20of%20medicines).
Older adults	• Avoid constipating products because older adults are more prone to constipation.
Choice of antacid	• Sodium and potassium salts are the most highly soluble, which enables them to have a quicker onset, but they are shorter acting. • Magnesium and aluminium salts are less soluble, so they have a slower onset but longer duration of action. • Calcium salts have the advantage of being quick acting and have a prolonged action.
Self-help measures	Dietary changes can help to lessen dyspepsia symptoms: • Change diet to a lower fat diet. • Keep alcohol intake to recommended levels. • Stop smoking. • Decrease weight. • Reduce caffeine intake. • Eat less but more often. • Avoid eating late at night.

Antacids

Antacids should be taken on an as-needed basis and are best taken after eating food. Most are marketed are combination products containing two, three or even four constituents. The rationale for combining different salts together appears to be twofold: (1) to ensure the product has quick onset (containing sodium or calcium) and a long duration of action (containing aluminium or calcium) and (2) to minimize any side effects that might be experienced from the product. For example, magnesium salts tend to cause diarrhoea, and aluminium salts tend to cause constipation; however, if both are combined in the same product, neither side effect is noticed. Some antacids can affect the absorption of medications via the mechanisms of chelation and adsorption. Commonly affected medicines include tetracyclines, quinolones, imidazoles, phenytoin, penicillamine and bisphosphonates. In addition, the absorption of enteric-coated preparations can be affected because antacids increase the stomach's pH. Most of these interactions are easily overcome by leaving a minimum gap of 1 hour between the respective doses of each medicine. Most patient groups can take antacids, although patients on salt-restricted diets (e.g., patients with coronary heart disease) should ideally avoid sodium-containing antacids.

Alginates (e.g., the Gaviscon range)

These are best given after each main meal and before bedtime, although they can be taken on an as-needed basis. They can be given during pregnancy and breastfeeding and to most patient groups, but as with antacids, patients on salt-restricted diets should ideally avoid sodium-containing alginate preparations. They are reported not to cause side effects or interactions with other medicines.

Ranitidine (e.g., Zantac range, Ranicalm)

Adults and children older than 16 years should take one tablet (75 mg) straight away, but if symptoms persist, another tablet should be taken 1 hour later. The maximum dosage is 300 mg (four tablets) in 24 hours. A General Sales List version of ranitidine is available (Zantac 75 Relief and Ranicalm) with a maximum dosage of two (150 mg) tablets in 24 hours. Ranitidine possesses no clinically important drug interactions, and side effects are rare. Evidence suggests that it can be used in pregnancy and breastfeeding, although manufacturers advise patients to speak to their doctors or pharmacists before taking.

Omeprazole (e.g., Pyrocalm Control)

People aged 18 years and older should take one tablet (20 mg) each day. It can cause several side effects (see Table 8.12) and has a few notable drug interactions because it is metabolized in the liver by cytochrome P450 isoenzymes. These include azole antifungals (decreased azole bioavailability), diazepam (enhanced diazepam side effects), fluvoxamine (increased omeprazole levels), cilostazol (increased cilostazol levels) and clopidogrel (reduced clopidogrel levels). Other interactions listed in the manufacturer's literature include phenytoin and warfarin, but their clinical significance appears low. It can be used in pregnancy, and during breastfeeding, it is only excreted in small amounts into breast milk.

Esomeprazole (Nexium Control)

This is indicated for the short-term treatment of reflux symptoms (e.g., heartburn and acid regurgitation) in adults. The dosage is one tablet or capsule (20 mg) once daily. Side effects, cautions and interactions are the same as for omeprazole.

Pantoprazole (Pantoloc Control)

Pantoprazole has a license for the short-term symptomatic treatment of GORD-like symptoms (e.g., heartburn). The dosage is one tablet (20 mg) each day. Manufacturers advise avoidance in pregnancy and breastfeeding females. However, limited data in breastfeeding indicate that maternal pantoprazole doses of 40 mg/day produce low levels in milk and would not be expected to cause any adverse effects in breastfed infants. Like other PPIs, pantoprazole is associated with the same side effects, interactions and cautions.

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GutsUK. https://gutscharity.org.uk/
New Zealand Society of Gastroenterology. https://nzsg.org.nz/

Diarrhoea

Background

Diarrhoea is not a disease but rather a sign of an underlying problem, such as an infection or GI disorder. It can be defined as an increase in frequency of the passage of soft or watery stools relative to the usual bowel habit for the individual. The World Health Organization (WHO) (2017) defines this as the passage of three or more loose or liquid stools per day. It can be classified as acute (<14 days), persistent (>14 days) or chronic (lasting >1 month).

Prevalence and epidemiology

The exact prevalence and epidemiology of diarrhoea are not well known. This is probably because of the number of patients who do not seek care or who self-medicate. However, acute diarrhoea does generate high medical consultation rates. It has been reported that children younger than the age of 5 years have between one and three bouts of diarrhoea per year and adults, on average, just less than one episode of diarrhoea per year.

Aetiology

The aetiology of diarrhoea depends on its cause. Acute gastroenteritis, the most common cause of diarrhoea in all age groups, is usually viral in origin. Commonly implicated viruses are the rotaviruses (now vaccine preventable) and noroviruses. Viruses tend to cause diarrhoea by blunting the villi of the upper small intestine, decreasing the absorptive surface. Bacterial causes of diarrhoea are normally a result of eating contaminated food or drink, which cause diarrhoea by a number of mechanisms. For example, enterotoxigenic *Escherichia coli* produces enterotoxins that affect gut function with secretion and loss of fluids, enteropathogenic *E. coli* interferes with normal mucosal function, and enteroinvasive *E. coli, Shigella* spp., and *Salmonella* spp. cause injury to the mucosa of the small intestine and deeper tissues.

Table 8.15
Causes of diarrhoea and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Bacterial or viral infection
Likely	• Anxiety • Excess alcohol • Irritable bowel syndrome • Medicine induced
Unlikely	• Faecal impaction • Giardiasis
Very unlikely	• Addison disease • Colorectal cancer • Diabetes • Hyperthyroidism • Inflammatory bowel disease • Malabsorption syndromes

Other organisms, for example, *Staphylococcus aureus* and *Bacillus cereus*, produce preformed enterotoxins, which on ingestion stimulate the active secretion of electrolytes into the intestinal lumen.

Arriving at a differential diagnosis

Most patients present to the pharmacy with a self-diagnosis. However, it is necessary to confirm this because patients' interpretations of their symptoms might not match the medical definition of diarrhoea. Although the most common causes of diarrhoea are infections, other conditions need to be considered (Table 8.15). Dehydration is the main complicating factor, especially in very young and very old people. A number of diarrhoea-specific questions should be asked to help establish a differential diagnosis (Table 8.16).

Clinical features of acute infectious diarrhoea

Symptoms are normally rapid in onset, with the patient having a history of prior good health. Ingestion of bacterial pathogens can give rise to symptoms in a matter of a few hours (toxin-producing bacteria) after eating contaminated food or up to 3 days later. Acute infective diarrhoea is usually watery in nature, with no blood present. Nausea and vomiting might be present as well as abdominal cramping, flatulence and tenderness. If rotavirus is the cause, the patient might also experience viral prodromal symptoms such as cough and cold. Complete resolution of symptoms is often seen within 24 hours but can last between 2 and 4 days.

Conditions to eliminate

Likely causes

Anxiety

This can present with only physical symptoms. These can be variable but include headache, insomnia, back pain and GI symptoms such as diarrhoea.

Excess alcohol

Temporary effects of short-term alcohol poisoning can lead to loss of coordination, confusion, slurred speech, vomiting and occasionally diarrhoea. Symptoms of dehydration usually appear a few hours after drinking and include headache and dizziness.

Irritable bowel syndrome

IBS is characterized by lower abdominal pain or discomfort, although left lower quadrant pain is more typical than right lower quadrant pain. Pain is accompanied by abdominal bloating and changes to bowel habits. Pain or discomfort is often relieved by defaecation. People can present with 'diarrhoea-predominant' symptoms. During bouts of diarrhoea, mucus tends to be visible on the

Table 8.16
Specific questions to ask the patient: Diarrhoea

Question	Relevance
Nature of the stools	• Diarrhoea associated with blood and mucus (dysentery) requires referral to eliminate invasive infection such as *Shigella, Campylobacter jejuni, Salmonella, Clostridium difficile* and *Escherichia coli* O157. • Bloody stools are also associated with conditions such as IBD or IBS.
Periodicity	• A history of recurrent diarrhoea with no identifiable cause could suggest IBS.
Onset and duration	• Acute: mostly infective origin • Chronic: common causes are IBS and IBD
Social history	• Food contamination is a common cause of diarrhoea. Ask about food consumption over the preceding couple of days and establish if others ate the same food and if they have symptoms.
Recent travel	• If the person has recently been to a non-Western country, giardiasis is a possibility.
Recent change of diet	• Changes in diet can cause changes to bowel function, for example, when away on holiday.

IBD, Inflammatory bowel disease; *IBS,* irritable bowel syndrome.

Table 8.17
Examples of medicines known to cause diarrhoea as a common or very common side effect

Alpha blocker	**Prazosin**
Angiotensin-converting enzyme inhibitors	Lisinopril, perindopril
Angiotensin receptor blocker	Telmisartan
Acetylcholinesterase inhibitors	Donepezil, galantamine, rivastigmine
Antacids	Magnesium salts
Antibacterials	All
Antidiabetics	Metformin, acarbose
Antidepressants	Selective serotonin reuptake inhibitors, clomipramine, venlafaxine
Antiemetics	Aprepitant, dolasetron
Antiepileptics	Carbamazepine, oxcarbazepine, tiagabine, zonisamide, pregabalin, levetiracetam
Antifungals	Caspofungin, fluconazole, flucytosine, nystatin (in large doses), terbinafine, voriconazole
Antimalarial	Mefloquine
Antiprotozoals	Metronidazole, sodium stibogluconate
Antipsychotic	Aripiprazole
Antivirals	Abacavir, emtricitabine, stavudine, tenofovir, zalcitabine, zidovudine, amprenavir, atazanavir, indinavir, lopinavir, nelfinavir, saquinavir, efavirenz, ganciclovir, valganciclovir, adefovir, oseltamivir, ribavirin, fosamprenavir
Beta-blockers	Bisoprolol, carvedilol, nebivolol
Bisphosphonates	Alendronic acid, disodium etidronate, ibandronic acid, risedronate, sodium clodronate, disodium pamidronate, tiludronic acid
Cytokine inhibitors	Adalimumab, infliximab
Cytotoxics	All classes of cytotoxics
Dopaminergics	Levodopa, entacapone
Growth hormone antagonist	Pegvisomant
Immunosuppressants	Ciclosporin, mycophenolate, leflunomide
Non-steroidal anti-inflammatory drugs	All
Ulcer healing	Proton pump inhibitors
Vaccines	Pediacel, *Haemophilus* spp., meningococcal
Miscellaneous	Calcitonin, strontium ranelate, colchicine, dantrolene, olsalazine, anagrelide, nicotinic acid, pancreatin, eplerenone, acamprosate

Adapted from Whittlesea, C., & Hodson, K. (2018). *Clinical pharmacy and therapeutics* (6th ed.). London: Churchill Livingston.

stools. Patients might also complain of increased stool frequency but pass normal or pellet-like stools. For further details on IBS, see later in this chapter.

Medicine-induced diarrhoea

Many medicines can induce diarrhoea (Table 8.17). If medication is suspected, the patient's doctor should be contacted and an alternative suggested.

Unlikely causes

Faecal impaction

Faecal impaction is usually seen in older adults and those with poor mobility. Patients might present with continuous soiling because of liquid passing around hard stools and mistakenly believe they have diarrhoea. On questioning, the patient might describe the passage of regular, poorly formed hard stools that are difficult to pass.

Giardiasis

Giardiasis, a protozoan infection of the small intestine, is contracted through drinking contaminated drinking water. It is an uncommon cause of diarrhoea in the West. The patient will present with watery and foul-smelling diarrhoea accompanied with symptoms of bloating, flatulence and epigastric pain. If giardiasis is suspected, the patient must be referred for confirmation and instigation of antibiotics.

Very unlikely causes

Addison disease

This a rare condition affecting those aged 30 to 50 years old. Symptoms can be non-specific and common to other conditions. Early symptoms include low mood, fatigue, muscle weakness, weight loss and loss of appetite, increased urination and increased thirst. Over time these symptoms worsen, and other symptoms such as diarrhoea, abdominal pain, nausea or vomiting, dizziness, cramps and darkening of the skin can occur.

Colorectal cancer

Approximately 40 000 new cases of colorectal cancer are registered each year in the United Kingdom, representing the second most common cause of cancer deaths. Occurrence is strongly related to age, with almost 75% of cases occurring in people aged 65 years and older. Colorectal carcinomas are rare in patients younger than 40 years, but any middle-aged patient presenting with signs of anaemia (e.g., fatigue, pale skin, shortness of breath) and a change in bowel habits should be viewed with suspicion. Persistent diarrhoea accompanied by a feeling that the bowel has not really been emptied is suggestive of neoplasm. This is especially true if weight loss is also present. Weight loss is a common and classic textbook symptom but is observed only in the later stages of the disease. Therefore, a patient is unlikely to have noticed a marked weight loss when visiting a pharmacy early in the disease progression.

Diabetes

Diarrhoea is a common symptom of diabetes and is more common in people who have had diabetes for a long time. In a person with undiagnosed diabetes, other more prominent symptoms would typically be present, including polyuria, polydipsia, losing weight and tiredness.

Hyperthyroidism

The signs and symptoms of hyperthyroidism can be varied, non-specific and mild. Diarrhoea is a common feature, but other symptoms such as anxiety, palpitations, heat intolerance, weight loss, insomnia and irritability are also prominent.

Inflammatory bowel disease

Crohn's disease and ulcerative colitis are characterized by relapse and remittance, and in both conditions, GI disturbance is very common, either as persistent diarrhoea or bloody diarrhoea associated with urgency and tenesmus. They can affect any age group, although the peak incidence is in those between 20 and 30 years. Both exhibit lower abdominal pain. In Crohn's disease, the most common place for it to start is at the end of the small intestine (ileum), causing right lower quadrant pain. In ulcerative colitis, the pain is more common in the left lower quadrant. Over time weight loss can be observed. Both are associated with extraintestinal symptoms, affecting between 25% and 40% of patients, and include arthritis, mouth ulcers, red eye and fatigue (caused by anaemia). Other non-specific symptoms such as malaise and fever can be present.

Malabsorption syndromes

Lactose intolerance

Lactose intolerance is often diagnosed in infants younger than 1 year old. In addition to more frequent loose bowel movements, symptoms such as fever, vomiting, perianal excoriation and a failure to gain weight might occur.

Coeliac disease

Symptoms are often non-specific, but adult patients have persistent GI symptoms that include steatorrhoea, bloating and abdominal pain accompanied with unintentional weight loss. Prolonged fatigue (often caused by anaemia) and persistent mouth ulcers can also be present.

A summary of the conditions that cause diarrhoea are shown in Table 8.18. Fig. 8.16 will aid in the differentiation of diarrhoeal cases that require referral.

Table 8.18
Summary for conditions that cause diarrhoea

Question	Age group	Acute or chronic	Timing	Weight loss	Blood in stools	Other symptoms
Addison disease	30–50 years	Chronic	Any	Yes	No	Fatigue, increased thirst and urination
Anxiety	Any	Either	Any	No	No	Headache, insomnia, palpitations
Colorectal cancer	Older than 65 years	Chronic	Any	Yes	Yes, but in latter stages	Fatigue, shortness of breath
Diabetes	Any	Chronic	Any	Yes	No	Polyuria, polydipsia and tiredness

Table 8.18
Summary for conditions that cause diarrhoea—cont'd

Question	Age group	Acute or chronic	Timing	Weight loss	Blood in stools	Other symptoms
Excess alcohol	Any but mainly young adults	Acute	Morning	No	No	Nausea and/or vomiting
Faecal impaction	Older adults	Chronic	Any	No	No	None
Giardiasis	Any	Acute	Any	No	No	Malaise, bloating
Hyperthyroidism	20–40 years	Chronic	Any	Yes	No	Palpitations, heat intolerance, insomnia and irritability
Irritable bowel syndrome	Younger than 45 years	Either	Remits and relapses	No	No	Constipation
Infection	Any	Acute	Any	No	Unusual	Nausea and/or vomiting
Malabsorption syndromes	Infants, middle-aged adults	Chronic		Yes	No	Fever, fatigue
Medicines	Any	Either	Any	No	No	None
Inflammatory bowel disease	20–30 years	Either	Remits and relapses	Yes	Possible	Malaise, fever

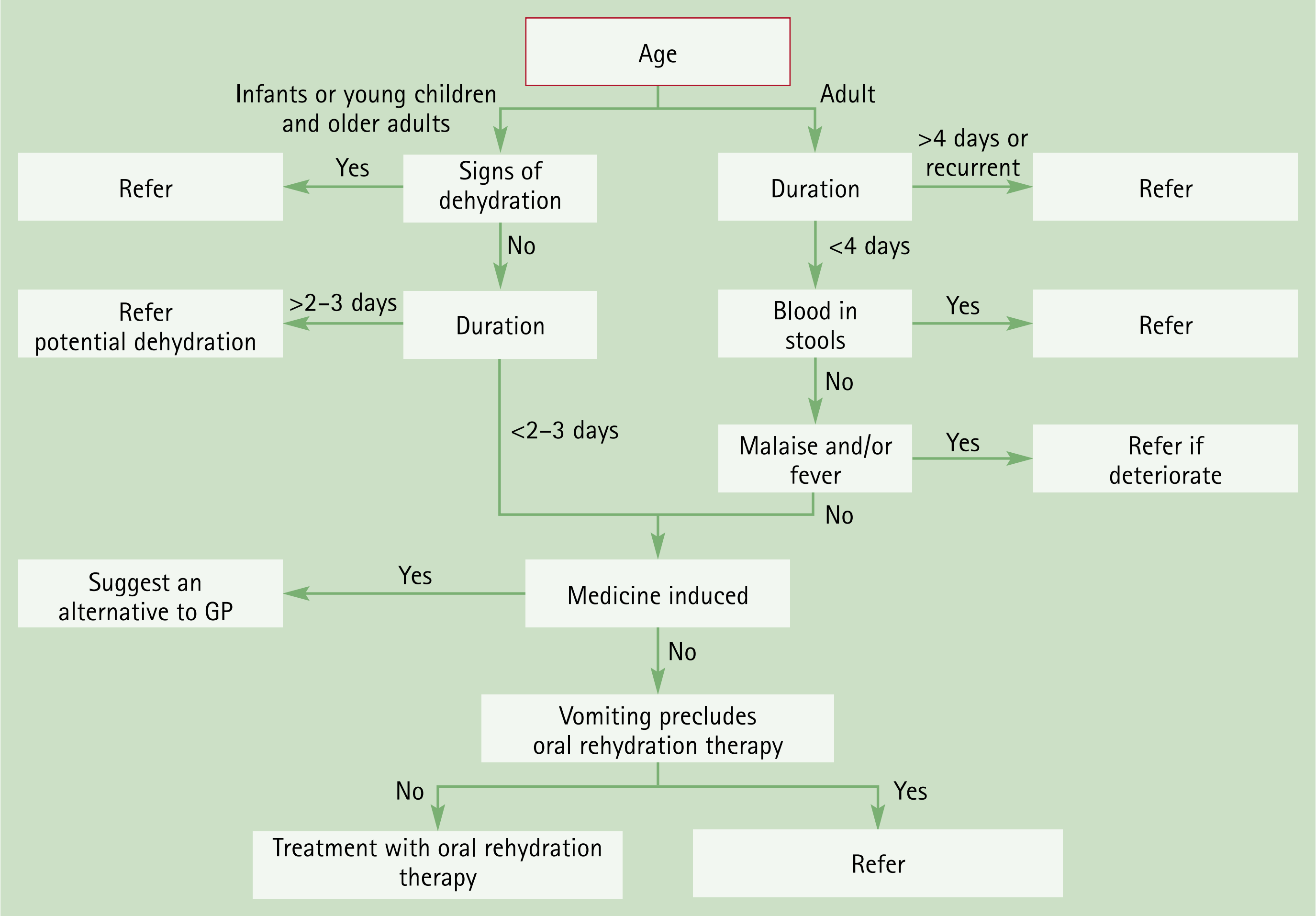
Age
Infants or young children and older adults
Adult
Signs of dehydration
Yes
Refer
No
Duration
>2–3 days
Refer potential dehydration
<2–3 days
Duration
>4 days or recurrent
Refer
<4 days
Blood in stools
Yes
Refer
No
Malaise and/or fever
Yes
Refer if deteriorate
No
Medicine induced
Yes
Suggest an alternative to GP
No
Vomiting precludes oral rehydration therapy
No
Treatment with oral rehydration therapy
Yes
Refer

Fig. 8.16 Primer for the differential diagnosis of diarrhoea.

Red flags indicative of referral: Diarrhoea

Reason for referral	Why referring	Timeframe for referral
Duration >2–3 days in children and older adults Patients unable to drink fluids In children younger than 1 year of age who have had repeated vomiting or multiple episodes of diarrhoea	At risk of dehydration and associated complications	Same-day referral
Change in bowel (long-term) habit in patients older than 40 years Presence of blood or mucus in the stool Persistent diarrhoea	Suggests inflammatory bowel disease (IBD), IBS or sinister pathology	Urgent referral
Diarrhoea after recent travel to tropical or subtropical climate	Suggests giardiasis	
Weight loss over time	Suggests diabetes, hyperthyroidism, Addison disease or malignancy	
Suspected faecal impaction in older adults	Outside scope of community pharmacist	As soon as practicable
Steatorrhoea	Suggests malabsorption syndrome	

Evidence base for over-the-counter medication

Acute infectious diarrhoea remains one of the leading causes of death in developing countries despite advances in its treatment. In developed and Western countries, diarrhoeal disease is primarily of economic and socially disruptive significance. Goals of OTC treatment is therefore concentrated on the relief of symptoms. Given that most causes of diarrhoea only last 24 to 48 hours, the main aim of treatment should be to reduce any potential dehydration caused by fluid loss.

Before considering treatment, it is important to stress to patients the importance of hand washing. Interventions that promote hand washing can reduce diarrhoea episodes by about one-third (Ejemot-Nwadiaro et al., 2021).

Oral rehydration solution

Oral rehydration solution (ORS) represents one of the major advances in medicine. It has proved to be a simple, highly effective treatment, which has decreased mortality and morbidity associated with acute diarrhoea in developing countries. The formula recommended by the WHO contains glucose (75 mmol/L), sodium (75 mmol/L), potassium (20 mmol/L), chloride (65 mmol/L) and citrate (10 mmol/L) in an almost isotonic fluid. However, UK preparations contain lower sodium concentrations (60 mmol/L of sodium) because diarrhoea tends to be isotonic, and therefore replacement of large quantities of sodium is less important.

Rice-based oral rehydration solution

In many developing countries, a glucose substitute was added to electrolytes because of glucose unavailability. Clinical trials showed these rice-based ORS to be highly efficacious, well tolerated and potentially more effective than conventional ORS.

Loperamide

Loperamide is a synthetic opioid analogue that is thought to exert its action via opiate receptors. It slows intestinal tract time, increasing the water resorbing capacity of the gut. It has been extensively researched, with many published trials investigating its effectiveness in acute infectious diarrhoea. Most well-designed, double-blind, placebo-controlled trials have consistently shown it to be significantly better than placebo and comparable to diphenoxylate in terms of reducing the duration of diarrhoea but with a longer duration of action. Loperamide is also available compounded with simethicone. However, there is little evidence of better efficacy in terms of diarrhoeal symptoms with this combination.

Bismuth subsalicylate

Bismuth-containing products have been used for many decades. Bismuth subsalicylate has been shown to be effective in treating traveller's diarrhoea. A review article by Steffen (1990) concluded that bismuth subsalicylate was clinically superior to placebo, decreasing the number of unformed stools and increasing the number of patients who were symptom free. However, two of the trials reviewed showed bismuth subsalicylate to be significantly slower in symptom resolution than its comparator drug, loperamide.

Summary

Because diarrhoea results in fluid and electrolyte loss, it is important to reestablish the normal fluid balance, so ORS is first-line treatment for all age groups, especially children and frail older adults. Loperamide should be reserved for situations when staying at home and resting would be impractical or inconvenient.

Practical prescribing and product selection

Prescribing information relating to the medicines used for diarrhoea is discussed and summarized in Table 8.19; useful tips relating to patients presenting with diarrhoea are given in 'Hints and tips' in Box 8.4.

Table 8.19
Practical prescribing: Summary of medicines for diarrhoea

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Oral rehydration salts	Infants and older	None	None	None	OK
Loperamide	Older than 12 years	Headache, flatulence, nausea			
Bismuth	Older than 16 years	Black stools or tongue	Quinolone antibiotics	None	Avoid if possible because of association with Reye syndrome

HINTS AND TIPS BOX 8.4: DIARRHOEA

Assessing the level of dehydration	Mild to moderate (<10%) dehydration • Thirst • Dry mouth • Headache • Dizziness • Dark urine Severe dehydration • Extreme thirst • Fast breathing • Fast pulse • Little or no urine • Confusion
Alternative to oral rehydration salts	• Patients can be advised to increase their intake of fluids, particularly fruit juices (for their glucose and potassium content) and soups (for their sodium chloride content).

Oral rehydration salts (e.g., Dioralyte, Dioralyte Relief [rice based])

Oral rehydration salts can be given to all patient groups and have no side effects or drug interactions. The volume of solution given depends on how much fluid is lost. Because infants and older adults are more at risk of developing dehydration, they should be encouraged to drink as much ORS as possible. In adults, 2 L of ORS should be given in the first 24 hours followed by unrestricted normal fluids, with 200 mL of rehydration solution per loose stool. The solution is best sipped every 5 to 10 minutes rather than drunk in large quantities less frequently. In infants, 1 to 1.5 times the usual feed volume should be given.

Loperamide (e.g., Dioraleze, Imodium range)

The dosage for people older than the age of 12 years is two capsules immediately followed by one capsule after each further bout of diarrhoea. A maximum of eight capsules can be taken in 24 hours.

Loperamide has an excellent safety record and has few common side effects. Central nervous system depressant effects and respiratory depression have been reported with high doses. It can be used in all patient groups. It is available in a range of formulations, such as dispersible tablets, melt tabs and liquid.

Bismuth

Bismuth (Pepto-Bismol Liquid, 87.6 mg/5 mL bismuth subsalicylate and chewable tablet, 262.5 mg) should only be given to people older than the age of 16 years. The dosage is 30 mL, or two tablets taken every 30 to 60 minutes, when needed, with a maximum of eight doses in 24 hours. Bismuth subsalicylate is well tolerated but can darken stool colour (caused by unabsorbed bismuth compound). Occasional use is not known to cause problems during pregnancy and breastfeeding, but the manufacturers state it should not be used. Bismuth can decrease the bioavailability of quinolone antibiotics; therefore, a minimum 2-hour gap should be left between doses of each medicine.

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Constipation

Background

Constipation, like diarrhoea, is a symptom rather than a condition. Constipation arises when a person experiences a reduction in their normal bowel habits accompanied by more difficult defecation, hard stools or both.

Prevalence and epidemiology

Constipation is very common, although its prevalence is not well established because of the use of different definitions and under-reporting due to high levels of self-treatment by patients. It occurs in all age groups but is especially common in older adults. It has been estimated that 25% to 40% of all people older than the age of 65 years have constipation. Many older adults have normal frequency of bowel movements but strain at stool. This is probably a result of a sedentary lifestyle, decreased fluid intake, poor nutrition, avoidance of fibrous foods and chronic illness. Females are two to three times more likely to have constipation than males, and 40% of females in late pregnancy experience constipation.

Aetiology

The normal function of the large intestine is to remove water and various salts from the colon and dry and expel faeces. Any process that facilitates water resorption will generally lead to constipation. The most common cause of constipation is a decrease in the intestinal tract transit time of food, which allows greater water resorption from the large bowel, leading to harder stools that are more difficult to pass. This is usually caused by a deficiency in dietary fibre, a change in lifestyle or environment and medication. Occasionally, patients ignore the defecation reflex because it may be inconvenient for them to defecate.

Arriving at a differential diagnosis

The first thing to do is establish the patient's current bowel habit compared with normal. Questioning should then concentrate on determining the cause (Table 8.20). A number of constipation-specific questions should be asked to help establish a differential diagnosis (Table 8.21).

Clinical features of constipation

Besides the inability to defecate, patients might also have abdominal discomfort and bloating. Specks of blood in the toilet might be present and are usually caused by straining at stool. Children may put off trying to go to the toilet as the child attempts to avoid painful defecation. Parents might also notice that the child is more irritable and has a decreased appetite.

Conditions to eliminate

Likely cause

Medicine-induced constipation

Many medicines are known to cause constipation. Most exert their action by decreasing gut motility, although opioids tend to raise sphincter tone and reduce sensitivity to rectal distension. A detailed medication history should always be sought from the patient. Table 8.22 lists the commonly implicated medicines that cause constipation.

Unlikely causes

Depression

Upwards of 20% of the population has a depressive episode at some time. Many present with physical as well as psychological symptoms. It has been reported that one-third of all patients with depression

Table 8.20
Causes of constipation and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Eating habits, lifestyle
Likely	• Medication
Unlikely	• Depression • Functional disorders (children) • Haemorrhoids • Irritable bowel syndrome • Pregnancy
Very unlikely	• Colorectal cancer • Diabetes • Hypothyroidism • Multiple sclerosis • Parkinson's disease

Table 8.21
Specific questions to ask the patient: Constipation

Question	Relevance
Lifestyle	- Diet: Low-fibre diets or change in diet will cause constipation. - Exercise: Sedentary behaviours can precipitate constipation.
Medication history	- Medicines are commonly implicated in causing or exacerbating constipation.
Associated symptoms	- Weight loss could suggest diabetes or malignancy. - Tiredness could suggest diabetes, hypothyroidism or malignancy. - Neurologic symptoms could suggest multiple sclerosis or Parkinson's disease.
Pain on defecation	- Associated pain when going to the toilet is usually caused by a local anorectal problem. Constipation is often secondary to the suppression of defecation because it induces pain.
Presence of blood	- Bright red specks in the toilet or smears on toilet tissue suggest haemorrhoids or a tear in the anal canal (fissure). - Blood is mixed in the stool (melaena) that appears black and tarry is suggestive of an upper gastrointestinal bleed.
Lifestyle changes	- Check for significant life events that might trigger anxiety, stress or depression because they can manifest with physiological symptoms.

Table 8.22
Examples of medicines known to cause constipation as a common or very common side effect

Alpha blockers	Prazosin
Antacids	Aluminium and calcium salts
Anticholinergics	Trihexyphenidyl, hyoscine, oxybutynin, procyclidine, tolterodine
Antidepressants	Tricyclics, selective serotonin reuptake inhibitors, reboxetine, venlafaxine, duloxetine, mirtazapine
Antiemetics	Palonosetron, dolasetron, aprepitant
Antiepileptics	Carbamazepine, oxcarbazepine
Antipsychotics	Phenothiazines, haloperidol, pimozide and atypical antipsychotics such as amisulpride, aripiprazole, olanzapine, quetiapine, risperidone, zotepine, clozapine
Antiviral	Foscarnet
Beta-blockers	Oxprenolol, bisoprolol, nebivolol; other beta-blockers tend to cause constipation more rarely
Bisphosphonates	Alendronic acid
Central nervous system stimulant	Atomoxetine
Calcium channel blockers	Diltiazem, verapamil
Cytotoxics	Bortezomib, buserelin, cladribine, docetaxel, doxorubicin, exemestane, gemcitabine, irinotecan, mitoxantrone, pentostatin, temozolomide, topotecan, vinblastine, vincristine, vindesine, vinorelbine
Dopaminergics	Amantadine, bromocriptine, cabergoline, entacapone, tolcapone, levodopa, pergolide, pramipexole, quinagolide
Growth hormone antagonist	Pegvisomant
Immunosuppressants	Basiliximab, mycophenolate, tacrolimus
Lipid-lowering agents	Cholestyramine, colestipol, rosuvastatin, atorvastatin (other statins uncommon), gemfibrozil

Continued

Table 8.22
Examples of medicines known to cause constipation as a common or very common side effect—cont'd

Alpha blockers	**Prazosin**
Iron	Ferrous sulphate
Metabolic disorders	Miglustat
Muscle relaxant	Baclofen
Nonsteroidal antiinflammatory drugs (NSAIDs)	Meloxicam: other NSAIDs, e.g., aceclofenac and cyclooxygenase-2 inhibitors reported as uncommon
Smoking cessation	Bupropion
Opioid analgesic	All opioid analgesics and derivatives
Ulcer healing	All proton pump inhibitors, sucralfate

Adapted from Whittlesea, C., & Hodson, K. (2018). *Clinical pharmacy and therapeutics* (6th ed.). London: Churchill Livingston.

present with GI complaints in a primary care setting. Symptoms of persistent low mood or loss of interest in most activities indicate depression, especially if they have been present for at least 2 weeks.

Functional causes in children

Constipation in children is common, and the cause can be varied. For example, the transition from breast milk to formula or from strained foods to table foods. Cow's milk is the most constipating component of a young child's diet. The transition to a daycare setting or an all-day school, with consequent loss of privacy, may be a contributing factor to constipation. A traumatic experience may also cause constipation, for example, unwillingness to defecate because of association of prior pain on defecation.

Haemorrhoids

Haemorrhoids can be associated with pain on defecation, leading to patients ignoring the urge to defecate and consequently developing constipation. For more information on haemorrhoids, see later in this chapter.

Irritable bowel syndrome

This can present with constipation-predominant symptoms. For more information on IBS, see later in this chapter.

Pregnancy

Constipation is common in pregnancy, especially in the third trimester. A combination of increased circulating progestogen, displacement of the uterus against the colon by the foetus, decreased mobility and iron supplementation all contribute to an increased incidence of constipation while pregnant. Most patients complain of hard stools rather than a decrease in bowel movements.

Very unlikely causes

Colorectal cancer

Any patient older than 40 years presenting for the first time with a marked change in bowel habit should be viewed with caution. Whereas diarrhoea and bleeding are more common bowel changes, constipation can occur because of obstruction. Other symptoms such as bloating, abdominal pain and sickness can be present.

Diabetes

Constipation is a common symptom of diabetes, but other more prominent symptoms are typically present, including polyuria, polydipsia, losing weight and tiredness.

Hypothyroidism

The signs and symptoms of hypothyroidism are often subtle and insidious in onset. Patients might experience weight gain, lethargy, cold intolerance, coarse hair, menstrual irregularities, dry skin and constipation. Constipation is often less pronounced than lethargy and cold intolerance. Hypothyroidism affects 10 times more females than males, and the peak incidence is in the fifth or sixth decade of life.

Multiple sclerosis

Multiple sclerosis typically presents between 20 and 50 years of age. Presenting symptoms and signs can vary greatly, although ocular symptoms are common, including partial or total unilateral vision loss, pain on eye movement and loss of colour discrimination. Other symptoms include central nervous system symptoms such as paraesthesia, motor weakness, bladder and bowel problems (e.g., constipation).

Parkinson's disease

A person with Parkinson disease can experience a wide range of physical and psychological symptoms. Classically tremor, slow movement and muscle stiffness are seen. Non-motor symptoms can be present before motor symptoms and include depression, insomnia and constipation.

Fig. 8.17 will aid in the differentiation among common causes of constipation and more serious causes.

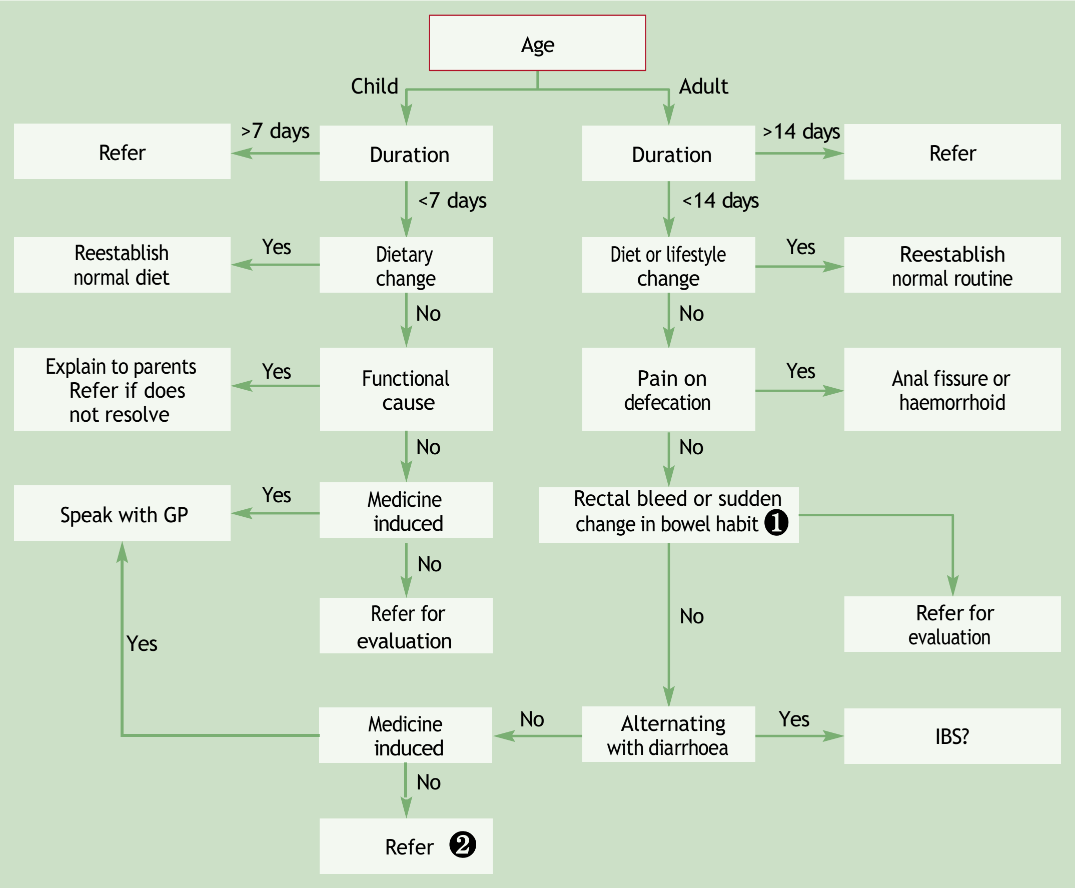
Age
Child
Adult
>7 days
Refer
Duration
Duration
>14 days
Refer
<7 days
<14 days
Reestablish normal diet
Yes
Dietary change
Diet or lifestyle change
Yes
Reestablish normal routine
No
No
Explain to parents Refer if does not resolve
Yes
Functional cause
Pain on defecation
Yes
Anal fissure or haemorrhoid
No
No
Speak with GP
Yes
Medicine induced
Rectal bleed or sudden change in bowel habit ❶
No
Refer for evaluation
Yes
No
Refer for evaluation
Medicine induced
No
Alternating with diarrhoea
Yes
IBS?
No
Refer ❷

Fig. 8.17 Primer for the differential diagnosis of constipation.

❶ Patients with unexplained constipation of recent onset accompanied with rectal bleeding should be referred for further investigation, most likely a colonoscopy or sigmoidoscopy and stool culture to eliminate carcinoma.

❷ If no obvious cause of constipation can be found, referral to a general practitioner (GP) is needed for further evaluation. *IBS*, Irritable bowel syndrome.

Red flags indicative of referral: Constipation

Reason for referral	Why referring	Timeframe for referral
• Patients older than 40 years with a marked or sudden change in bowel habit with no obvious cause • Bloody stools • Signs of anaemia	• Suspect lower GI tract cancer	• Same-day referral
• Low mood or loss of interest	• Suspect depression	• As soon as practicable
• >14 days' duration, with no identifiable cause	• Further investigation required to rule out more sinister causes	
• Tiredness	• Check for thyroid dysfunction and diabetes	
• Pain on defecation that might cause the patient to suppress the defecation reflex	• Check for anal fissure	

Evidence base for over-the-counter medication

For uncomplicated constipation, non-drug treatment is advocated as first-line treatment for all patient groups because simple dietary and lifestyle modifications (increasing exercise) relieve most acute cases of constipation. Advice includes increasing fluid and fibre intake. Dietary fibre increases stool bulk, stool water content and colonic bacterial load. Fibre intake should be increased to approximately 30 g/day in the form of fruit, vegetables, cereals, grain foods and whole-grain bread. It is important to remind patients that adequate fluid intake (2 L/day) is needed when following a high-fibre diet; patients might experience excessive gas production, colicky abdominal pain and bloating. Effects of a high-fibre diet are usually seen in 3 to 5 days.

If medication is required, four classes of OTC laxatives are available—bulk-forming agents, stimulants, osmotics and stool softeners. Despite their widespread use, surprisingly few well-designed trials have substantiated clinical efficacy.

A systematic review in 1997 identified 36 trials involving 1815 participants who met their inclusion criteria; it involved 25 different laxatives representing all four classes (Tramonte et al., 1997). Twenty of the trials compared laxative with placebo or regular diet, 13 of which demonstrated statistically significant increases in bowel movement. The remaining 16 trials compared different types of laxatives with each other. The review concluded that laxatives do increase the number of bowel movements, and in 9 of 11 trials studying overall symptom control, laxatives performed significantly better than placebo. Unfortunately, because of a lack of comparative trial data, the review could not conclude which laxative was most efficacious. A more recent review of both stimulant and non-stimulant laxatives in functional constipation also found that all laxative classes are superior to placebo (Paré & Fedorak, 2014). However, comparisons between classes could not be made.

Summary

Laxatives work, but deciding which class to use should be driven by factors such as the patient's health status, the side effect profile of the medicine and the cost.

Practical prescribing and product selection

Prescribing information relating to the medicines used for constipation is discussed and summarized in Table 8.23; useful tips relating to these medicines are given in 'Hints and tips' in Box 8.5.

OTC products are licensed for use in young children, but in accordance with good practice, children younger than 6 years who have failed to respond to dietary intervention should be referred to a doctor. Doses for children younger than 6 years old are therefore not provided in individual entries.

Bulk-forming laxatives

Bulk-forming laxatives exert their effect by mimicking increased fibre consumption, swelling in the bowel and increasing faecal mass. In addition, they encourage the proliferation of colonic bacteria, which helps to further increase faecal bulk and stool softness. Patients should be advised to increase their fluid intake while taking bulk-forming medicines. The effect is usually seen in 12 to 36 hours but can take as long as 72 hours. Side effects commonly experienced include flatulence and abdominal distension. They can be taken by all patient groups, have no drug interactions and are the first choice during pregnancy and breastfeeding.

Ispaghula husk (e.g., Fybogel)

The dosage for children older than 12 years of age is one sachet or two level 5-mL spoonsful twice daily; for children between 6 and 12 years, the dosage is {1/2} to one 5-mL spoonful twice daily.

Table 8.23
Practical prescribing: Summary of medicines for constipation

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Bulk forming					
Ispaghula husk	Older than 6 years	Flatulence, abdominal bloating	None	None	OK
Stimulants					
Senna	Older than 12 years	Abdominal pain	None	None	OK
Glycerol	Infants and older[a]				
Sodium picosulfate	Older than 4 years[a]				
Bisacodyl	Older than 2 years[a]				
Osmotics					
Lactulose	Infants and older[a]	Flatulence, abdominal pain, and nausea or vomiting	None	None	OK
Magnesium hydroxide	Older than 3 years[a]				
Stool softeners					
Docusate	Older than 12 years	None reported	None	None	OK

[a] Product licenses allow prescribing to children younger than 6 years, but it is good practice to refer to a medical practitioner unless the pharmacist is competent in prescribing laxatives for children.

HINTS AND TIPS BOX 8.5: CONSTIPATION

Blood seen with stools	• In most cases, blood in the stool does not indicate sinister pathology. Patients presenting with one-off episodes of bright red blood can be managed in the pharmacy. • Tarry or black stool suggests substantial blood loss and must be referred.
Sachets containing ispaghula husk	• After the granules have been mixed with water, the drink should be taken as soon as the effervescence subsides because the drink sets and becomes undrinkable.
Lactulose taste	• The sweet taste is unpalatable to many patients, especially if high doses need to be taken.
Bisacodyl	• Bisacodyl tablets are enteric coated, and patients should be told to avoid taking antacids and milk at the same time because the coating can be broken down, leading to dyspepsia and gastric irritation.
Laxative abuse	• Some people, especially young females, use laxatives as a slimming aid. Any very slim person who is regularly purchasing laxatives should be politely asked about why they are taking the laxatives.
Laxative onset of action	• Stimulants: 6–12 hours • Osmotics: 48–72 hours • Bulk forming: 12–72 hours • Stool softeners: >72 hours
Avoid drinks with caffeine	• These can act as a diuretic and serve to make constipation worse.
Combining laxatives	• There is little evidence on the beneficial effect of combining different classes of laxatives.
Administration of suppositories	1. Wash your hands. 2. Lie on one side with your knees pulled up towards your chest. 3. Gently push the suppository, pointed end first, into your back passage with your finger. 4. Push the suppository in as far as possible. 5. Lower your legs, roll over onto your stomach and remain still for a few minutes. If you feel your body trying to expel the suppository, try to resist this. Lie still and press your buttocks together. 6. Wash your hands. **Note:** For some suppositories, such as glycerol, it is recommended that the suppository be dipped in water before insertion.

Stimulant laxatives (e.g., bisacodyl, glycerol, senna, sodium picosulfate)

Stimulant laxatives increase GI motility by directly stimulating the colonic nerves. This action presumably causes abdominal pain and is the main side effect associated with stimulant laxatives. Their onset of action is quicker than that of other laxative classes, with patients experiencing a bowel movement in 6 to 12 hours when taken orally. They can be taken by all patient groups, have no drug interactions and are safe in pregnancy and breastfeeding. However, because of their ability to cause muscle contractions, they are best avoided in pregnancy.

Bisacodyl (Dulcolax)

The dosage for those over the age of 6 is 5 to 20 mg at night, but the lowest effective dose should be used.

Glycerol suppositories

Glycerol suppositories are normally used when a bowel movement is needed quickly. The patient should experience a bowel movement in 15 to 30 minutes. Varying sizes are made to accommodate use for different ages. The 1-g suppositories are designed for infants, the 2-g for children and the 4-g for adults.

Senna (e.g., Senokot)

Adults and children older than 12 years should take 7.5 to 15 mg each day (one or two tablets or 5–10 mL), preferably at bedtime.

Sodium picosulfate (e.g., Dulcolax Adult Pico Liquid, 5-mg/5-mL oral solution)

Adults and children older than 18 years should take 5 to 10 mg (5–10 mL) at night. In children older than 6 years, the dosage is 2.5 mg (2.5 mL).

Osmotic laxatives

These (e.g., lactulose, macrogol [polyethylene glycol] and magnesium salts) act by retaining fluid in the bowel by osmosis or by changing the pattern of water distribution in the faeces. Their effect is usually seen in 48 to 72 hours. Flatulence, abdominal pain and nausea or vomiting are commonly reported. They can be taken by all patient groups, have no drug interactions and are safely used in pregnancy and breastfeeding.

Lactulose

Lactulose is given twice daily for all ages. The dosage for adults is initially 15 mL (adjusted upwards depending on response), and for children between 6 and 17 years, the dosage is 5 to 20 mL. It has been reported that up to 20% of patients experience troublesome flatulence and cramps, although these often settle after a few days.

Magnesium salts

Magnesium, when used as a laxative, is usually given as magnesium hydroxide. The adult dosage ranges between 30 to 45 mL at night when needed.

Stool softeners (liquid paraffin and docusate sodium)

These work by decreasing surface tension and increasing penetration of intestinal fluid into the faecal mass. Liquid paraffin has traditionally been used to treat patients with constipation. However, the adverse side effect profile of liquid paraffin now means that it should not be recommended.

Docusate sodium (e.g., DulcoEase, Dioctyl)

Adults and children older than 12 years should take up to 500 mg/day in divided doses. It can be taken by all patient groups, has no side effects or drug interactions and is safely used in pregnancy and breastfeeding.

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Irritable bowel syndrome

Background

IBS is one of the most common GI tract conditions seen in primary care. It can be defined as a functional bowel disorder (i.e., absence of abnormality) in which abdominal pain and bloating are associated with a change in bowel habits. The diagnosis is suggested by the presence of longstanding relapsing colonic symptoms without any deterioration in the patient's general health.

Prevalence and epidemiology

Adult prevalence rates in Western countries are reported to be between 10% and 20%. Approximately twice as many females than males are affected. It most commonly affects people between 20 and 40 years old, and onset after the age of 50 years is unusual.

Aetiology

There are no specific anatomical, biochemical or microbiological factors to explain the aetiology of IBS, but it is now clearly understood to be multifactorial. Many factors can contribute to disease expression and include motility dysfunction, diet and genetics. In a small proportion of cases, symptoms appear after bacterial gastroenteritis. Psychological factors also influence symptom reporting and consultation, and some studies have shown that patients who have higher levels of stress or depression experience worse symptoms than other patients. Flare-up of symptoms has also been associated with periods of increased stress. Symptoms of diarrhoea and constipation appear to be linked with hyperactivity of the small intestine and colon in response to food ingestion and parasympathomimetic drugs. Excessive parasympathomimetic activity might account for mucus associated with the stool.

Arriving at a differential diagnosis

IBS is essentially a diagnosis of exclusion, and a careful and thorough history of the patient's symptoms is essential. A number of IBS-specific questions should be asked to help establish a differential diagnosis (Table 8.24).

Clinical features of irritable bowel syndrome

IBS is characterized by abdominal pain or discomfort located especially in the left lower quadrant of the abdomen, which is often relieved by defecation or the passage of wind. Altered defecation, constipation or diarrhoea with associated bloating is also normally present. People with IBS can present with 'diarrhoea-predominant', 'constipation-predominant' or alternating symptom profiles. During bouts of diarrhoea, mucus tends to be visible on the stools. Patients might also complain of increased stool frequency but pass normal or pelletlike stools. Diarrhoea on awakening and shortly after meals is also observed in many patients. IBS is likely if the patient has had any of the following symptoms for 6 months:

- Abdominal pain or discomfort
- Bloating
- Change in bowel habits

Table 8.24
Specific questions to ask the patient: Irritable bowel syndrome (IBS)

Question	Relevance
Age	• IBS usually affects people younger than 45 years of age. • Care is required in labelling middle-aged (i.e., older than 45 years old) and older patients with IBS when presenting with bowel symptoms for the first time. Prevalence of organic bowel disease is more common after the age of 45 years.
Periodicity	• IBS tends to be episodic. The patient might have a history of being well for a number of weeks or months in between bouts of symptoms. Often, patients can trace their symptoms back many years.
Presence of abdominal pain	• The nature of pain experienced by patients with IBS is very varied, ranging from localized and sharp to diffuse and aching. It is therefore not very discriminatory; however, the patient will probably have experienced similar abdominal pain in the past.
Location of pain	• Pain from IBS is normally located in the left lower quadrant.
Diarrhoea and constipation	• Patients with IBS do not have textbook definitions of constipation or diarrhoea, but bowel function will be different than normal. • Constipation-predominant IBS is more common in females.

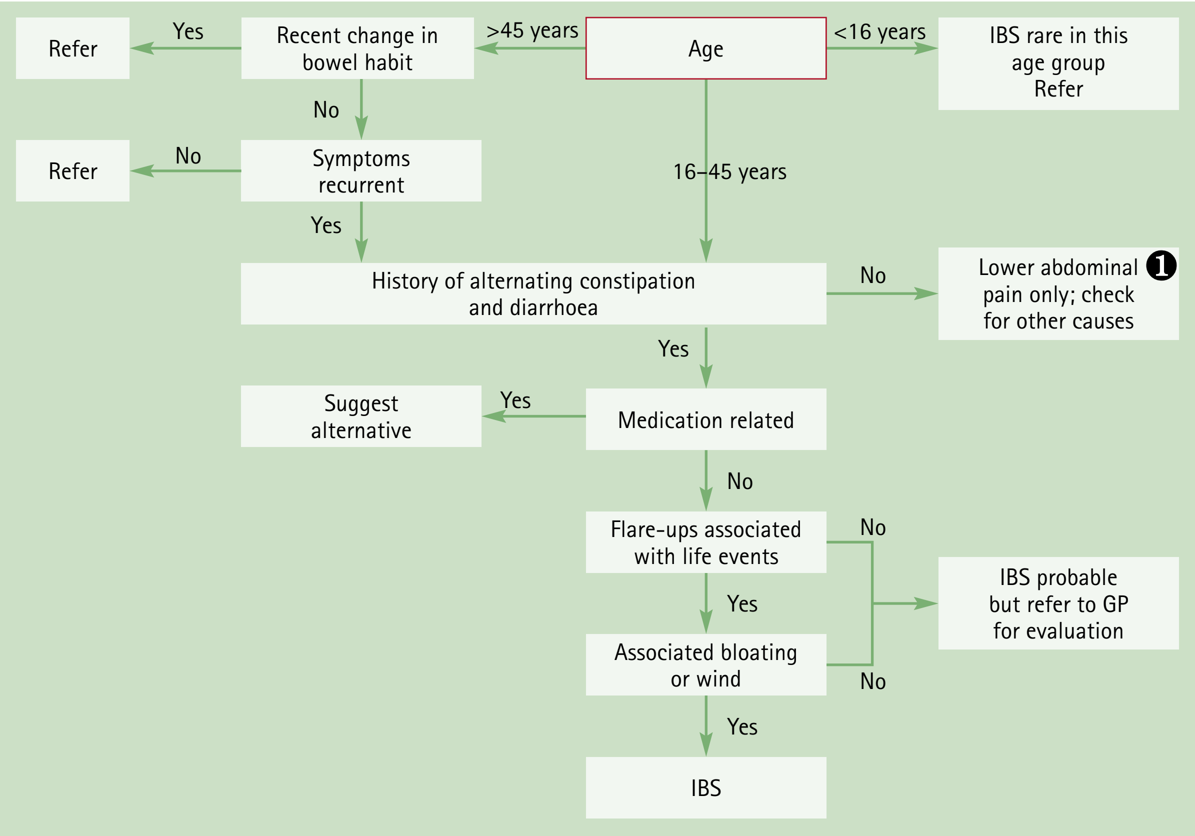
Refer
Yes
Recent change in bowel habit
>45 years
Age
<16 years
IBS rare in this age group Refer
No
Refer
No
Symptoms recurrent
16–45 years
Yes
History of alternating constipation and diarrhoea
No
Lower abdominal pain only; check for other causes ❶
Yes
Suggest alternative
Yes
Medication related
No
Flare-ups associated with life events
No
IBS probable but refer to GP for evaluation
Yes
Associated bloating or wind
No
Yes
IBS

Fig. 8.18 Primer for the differential diagnosis of irritable bowel syndrome (IBS).

❶ Lower abdominal pain. See Fig. 8.31 for a primer on the differential diagnosis of abdominal pain. *GP*, General practitioner.

Conditions to eliminate

Constipation and diarrhoea

Because the major presenting symptom of IBS is an alteration in defecation, it is necessary to differentiate IBS from constipation and diarrhoea. For further information differentiating these conditions from IBS, see 'Conditions to eliminate' under diarrhoea and constipation.

Fig. 8.18 will aid in the differentiation of IBS from other abdominal conditions.

Red flags indicative of referral: Irritable bowel syndrome

Reason for referral	Why referring	Timeframe for referral
Blood in the stool	The presence of blood in the stool is unusual in IBS and can suggest IBD	As soon as practicable
Fever Nausea or vomiting Severe abdominal pain	Not usually associated with IBS; suggests origin of symptoms from other abdominal causes	
Children younger than 16 years Patients older than 45 years with recent changes to bowel habit	IBS is unusual in these age groups	
Steatorrhoea	Associated with malabsorption syndromes	

Evidence base for over-the-counter medication

Before medicines are recommended, it might be useful to discuss if stress is a factor and if it can be avoided. In addition, dietary modification has shown to be effective for some patients (see 'Hints and tips' in Box 8.6). If diet is deemed a major contributor towards symptoms, food avoidance can be tried. Suspected food products must be excluded from the diet for a minimum of 2 weeks and then gradually reintroduced to determine whether the food item triggers symptoms.

Antispasmodics are considered first-line pharmacologic intervention for IBS, although the evidence base for them is weak; these include mebeverine, alverine, hyoscine and peppermint oil. In addition, bulk-forming and stimulant laxatives can be used to treat patients with constipation-predominant IBS and loperamide for diarrhoea-predominant IBS. Both laxatives and diarrhoeals can be taken on a regular basis using the lowest effective dose. The following section only concentrates on the evidence for products specifically marketed for the treatment of patients with IBS.

Antispasmodics

A Cochrane review (Ruepert et al., 2011) concluded that antispasmodics as a class of medicines compared with placebo provide a statistically significant benefit for abdominal pain, global assessment and IBS symptom scores. However, antispasmodics are pharmacologically diverse, and in their review, it was not possible to include all compounds (because of a limited number of studies) at subgroup analysis. Therefore, it was not possible to determine the individual effectiveness of certain OTC antispasmodics. No data were reviewed for alverine, and only one trial was included that considered mebeverine. In that trial (Kruis et al., 1986), no statistically significant effect for improvement of global assessment was found. This was also the case for hyoscine. The only OTC product for which the review found evidence of efficacy was peppermint oil. For peppermint oil, a statistically significant effect for improvement of global assessment and for improvement of IBS symptom score was found.

Alternative treatments

Physical activity

A Cochrane review (Nunan et al., 2002) identified 11 studies (n = 622 participants) involving physical activity interventions. Results suggested IBS symptoms may improve compared with usual care, but the evidence is limited because of poor trial design.

Herbal remedies

Herbal remedies for IBS have been subject to a Cochrane review (Liu et al., 2006). Seventy-five trials were reviewed, involving 71 different herbal medicines versus placebo or conventional pharmacological treatment. When compared with placebo, STW 5 (Iberogast) and STW5-II, Padma Lax, Ton Gxie Yao Fang and Ayurvedic preparations showed significant improvement of global symptoms. Compared with conventional therapy (in 65 trials testing 51 different herbal medicines), 22 herbal medicines demonstrated a statistically significant benefit for symptom improvement. Most trials were, however, deemed to be of poor methodological quality, and the authors concluded that findings should be interpreted with caution.

Probiotics

Probiotics, such as *Lactobacillus* and *Bifidobacterium,* have also been promoted for patients with IBS. A systematic review identified 18 studies using probiotics alone or in combination for the treatment of IBS (Moayyedi et al., 2010). The results suggested that

HINTS AND TIPS BOX 8.6: IRRITABLE BOWEL SYNDROME

Dietary advice	Have regular meals and avoid missing meals. Drink at least 8 cups of fluid per day, especially noncaffeinated drinks. Reduce intake of alcohol and fizzy drinks. Consider limiting intake of high-fibre food. Reduce intake of processed and recooked foods. Limit fresh fruit to three portions per day.

Adapted from National Institute for Health and Care Excellence. (2008). Guidelines. Taken from NICE CG61. https://www.nice.org.uk/guidance/cg61.

probiotics significantly improved IBS symptoms, and there was no apparent difference across the probiotics. However, the authors noted that there was potential publication bias in the review, with an overrepresentation of small positive studies; therefore, these estimates of efficacy were likely to be overestimates. The authors concluded that probiotics appear to be effective in IBS; however, the size of the effect and the effectiveness of individual probiotics is still to be established. Conclusions from a recent systematic review by the British Dietetic Association (McKenzie et al., 2016) recommended that although probiotics are unlikely to provide substantial benefits, if individuals choose to try them, they should try one at a time and for a minimum of 4 weeks before switching or stopping.

Relaxation therapy and cognitive behavioural therapy

A 2009 Cochrane review concluded that cognitive-behavioural therapy might be effective, although studies included in the review were of poor quality (Zijdenbos et al., 2009).

Hypnotherapy

A 2007 Cochrane review (Webb et al., 2007) assessed four studies (*n* = 147) on hypnotherapy. Conclusions from the authors suggested hypnotherapy might be effective in treating patients' IBS symptoms, including abdominal pain, but studies reviewed were of poor quality and small size, so the findings need to be interpreted with caution.

Practical prescribing and product selection

Prescribing information relating to the medicines used for IBS is discussed and summarized in Table 8.25; useful tips relating to the treatment of patients with IBS are given in 'Hints and tips' in Box 8.6.

All marketed products can be given to children (see individual entries), but anyone younger than 16 years suspected of having IBS should be referred to a doctor because IBS in this age group is unusual.

Hyoscine butyl bromide (Buscopan IBS Relief, Buscopan Cramps)

The recommended starting dosage for adults is one tablet, three times a day, although this can be increased to two tablets, four times a day, if necessary. Buscopan Cramps can be given to children older than the age of 6 years (one tablet three times a day). It is a quaternary derivative of hyoscine, so it does not readily cross the blood–brain barrier; therefore, sedation is not normally experienced, although it might cause dry mouth and skin rash, but these are uncommon. Because of its anticholinergic effects, it is best avoided with other medicines that also have anticholinergic effects (e.g., antihistamines, tricyclic antidepressants, neuroleptics, disopyramide). Data for use during pregnancy and breastfeeding are limited, and manufacturers recommend that they best avoided if possible. They should also be avoided in patients with glaucoma, myasthenia gravis and prostate enlargement.

Mebeverine (Colofac IBS)

Adults should take one tablet three times a day, preferably 20 minutes before meals. Mebeverine is not known to interact with other medicines, has no cautions in its use and can be given in pregnancy and breastfeeding, although there is a lack of detailed studies. It is associated with very few side effects, although allergic reactions have been reported, but their frequency has not been established.

Table 8.25
Practical prescribing: Summary of irritable bowel syndrome medicines

Name of medicine	Use in children[a]	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Hyoscine	Older than 6 years	None	Tricyclic antidepressants, neuroleptics, antihistamines, disopyramide	Glaucoma, myasthenia gravis, prostate enlargement	Limited data: manufacturer recommends avoid
Mebeverine	Older than 18 years		None	None	OK
Peppermint oil	Older than 15 years				OK in pregnancy; try to avoid in breastfeeding because it may reduce milk supply
Alverine	Older than 12 years				OK

[a] Irritable bowel syndrome (IBS) is unusual in children. Any person younger than 16 years of age presenting with IBS-like symptoms should be referred for further evaluation.

Alverine (Spasmonal)

Adults and children older than 12 years should take one or two capsules three times a day. Like mebeverine, alverine is not known to interact with other medicines, has no cautions in its use and can be given to all patient groups, including pregnant females and whilst breastfeeding. Rash, nausea, headache, dizziness, itching and allergic reactions have been reported, but their incidence is unknown.

Peppermint oil (Colpermin IBS Relief)

Adults and children older than 15 years should take one capsule three times a day before food. This can be increased to two capsules three times a day for severe symptoms. It can cause heartburn and allergic rashes, but the incidence is unknown. It is safe to use in pregnancy, but in theory, it can decrease breast milk production. It has no drug interactions and can be used by all patient groups.

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Websites

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Irritable Bowel Syndrome Group. http://www.ibsgroup.org
NICE Guidance 61. www.nice.org.uk/guidance/cg61

Haemorrhoids

Background

Haemorrhoids (piles) are the most common problem affecting the anorectal region. Patients might feel embarrassed talking about symptoms, and it is important that all requests for advice are treated sympathetically to avoid embarrassing the patient.

Prevalence and epidemiology

The exact prevalence of haemorrhoids is unknown, but it is very common. Reports vary, but upwards of one in two people will experience at least one episode at some point during their lives. Haemorrhoids can occur at any age but are rare in people younger than 20 years. They affect both sexes equally and are more common with increasing age, especially in people aged 45 to 65 years. There is a high incidence of haemorrhoids in pregnant females.

Aetiology

The cause of haemorrhoids is multifactorial, with anatomic (degeneration of elastic tissue), physiological (increased anal canal pressure) and mechanical (straining at stool) processes implicated. Haemorrhoids have been traditionally described as engorged veins of the haemorrhoidal plexus. The analogy of varicose veins of the anal canal is often used but is misleading. Current thinking favours the theory of prolapsed anal cushions. Anal cushions maintain fine continence; these are submucosal vascular structures suspended in the canal by a connective tissue framework derived from the internal anal sphincter and longitudinal muscle. Within each of the three cushions is a venous plexus fed by an arteriovenous blood supply. Veins in these cushions fill with blood when sphincters inside them relax and empty when the sphincters contract. Fragmentation of the connective tissue supporting the cushions leads to their descent. The prolapsed anal cushion has impaired venous return, resulting in venous stasis and inflammation of the cushion's epithelium.

Haemorrhoids are classified as internal or external. This distinction is an anatomic one. Superior to the anal sphincter, there is an area known as the *dentate line*. At this junction, epithelial cells change from squamous to columnar epithelial tissue. Above the

Table 8.26
Causes of rectal bleeding and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	Haemorrhoids
Likely	Anal fissure
Unlikely	Inflammatory bowel disease Pruritus ani
Very unlikely	Anal or colorectal cancer Diverticulitis Peptic ulcer Polyps Proctitis

dentate line, haemorrhoids are classified as internal and below as external. Furthermore, internal haemorrhoids are graded according to severity: grade I, do not prolapse out of the anal canal; grade II, prolapse on defecation but reduce spontaneously; grade III, require manual reduction; and grade IV, cannot be reduced.

Arriving at a differential diagnosis

Rectal bleeding tends to cause the greatest concern and often motivates the patient to seek help. Generally, rectal bleeding is of little consequence but should be thoroughly investigated to exclude other pathology (Table 8.26). A number of haemorrhoid-specific questions should be asked to help establish a differential diagnosis (Table 8.27).

Clinical features of haemorrhoids

Symptoms experienced by the patient depend on the severity or type of haemorrhoid. Bright red painless rectal bleeding is the most common symptom. It typically occurs with defecation. Blood is usually seen as spotting around the toilet, streaking on toilet tissue or visible on the surface or pink-coloured water in the toilet bowl. Itching and irritation are also commonly observed. Symptoms are often intermittent, and each episode usually lasts from a few days to a few weeks. Internal haemorrhoids are rarely painful, whereas external haemorrhoids can cause pain because of the cushion's becoming thrombosed. Pain is described as a dull ache that increases in severity when the patient defecates, leading to patients ignoring the urge to defecate. This can then lead to constipation, which in turn leads to more difficulty in passing stools and further increases the pain associated with defecation.

Conditions to eliminate

Likely cause

Anal fissure

Anal fissures are common, with the 15- to 40-year-old age group most affected; they are also often experienced during pregnancy. Symptoms often follow a period of constipation and are normally caused by straining at stool. Pain always occurs with defecation, which can be severe and sharp, with pain lasting for a number of hours after defecation. Bright red blood is commonly but not always seen.

Table 8.27
Specific questions to ask the patient: Haemorrhoids

Question	Relevance
Pain associated with defecation	Pain, if experienced, tends to occur on defecation suggests haemorrhoids. Sharp or stabbing pain at the time of defecation can suggest an anal fissure or tear.
Nature of rectal bleeding	Blood that appears bright red and visible on the toilet bowl or surface of the stool suggests haemorrhoids. Blood mixed in the stool suggests a GI bleed. Large volumes of blood not associated with defecation may suggest carcinoma. Bloody diarrhoea suggests IBD.
Associated symptoms	Anal itching suggests haemorrhoids or pruritus ani. Abdominal pain is associated with IBD, malignancy and diverticulitis. Weight loss can suggest malignancy. Fever and malaise suggest IBD.
Precipitating factors	Diet: A lack of dietary fibre that leads to constipation is a contributory factor to haemorrhoids. The passage of hard stools and straining during defecation can cause haemorrhoids Medications: Medicines that are prone to causing constipation (Table 8.22) may lead to haemorrhoids Lack of exercise

Unlikely causes

Inflammatory bowel disease (ulcerative colitis and Crohn's disease)

In mild cases of both conditions, a history of bloody diarrhoea is one of the major presenting symptoms. However, other symptoms such as malaise, fever and abdominal pain will be present. For fuller descriptions of their presentations, please refer to the diarrhoea section earlier in this chapter.

Pruritus ani

A sensation of itching and burning of the perianal area might be caused by irritation from faecal matter (most common cause), dermatitis or infection. Rectal bleeding is not present.

Very unlikely causes

Anal or colorectal

Rectal bleeding is observed in both cancers, but bleeding can depend on the site of the tumour; for example, sigmoid tumours lead to bright red blood in or around the stool. Rectal bleeding tends to be persistent and steady though slight for all tumours. Any patient presenting with rectal bleeding accompanied with either unexplained abdominal pain or weight loss should be seen by a GP because onward referral under a suspected lower GI cancer pathway should be instigated.

Diverticulitis

This is usually associated with intermittent left lower abdominal pain, bloating and changes in bowel habits. On examination, tenderness will be felt in the left lower quadrant. However, it may present with painless rectal bleeding. Its incidence increases with increasing age with most cases being identified in people older than the age of 50 years.

Peptic ulcer

Erosion of the stomach wall or upper intestine is normally responsible for GI bleeds and is often associated with NSAID intake. The colour of the stool is related to the rate of bleeding. Stools from GI bleeds can be tarry (indicating a bleed of 100–200 mL of blood) or black (indicating a bleed of 400–500 mL of blood). If a patient is also experiencing haematemesis, it further suggests that the source of the bleed is coming from the upper GI tract.

Polyps

If symptoms are experienced the patient may report rectal bleeding, fatigue and changes in bowel movements. Risk factors for development include increasing age and a family history of colon cancer or polyps.

Proctitis

Proctitis is inflammation of the lining of the rectum. Common symptoms include bloody diarrhoea, tenesmus and pain on defecation. It is associated with sexually transmitted diseases.

Fig. 8.19 will aid in the differentiation of haemorrhoids.

Red flags indicative of referral: Haemorrhoids

Reason for referral	Why referring	Timeframe for referral
• Persistent or marked change in bowel habit in patients older than 40 years	• Causes such as diverticulitis, polyps and malignancy become are more likely	• Urgent to doctor
• Abdominal pain or weight loss in association with rectal bleeding	• Malignancy becomes more likely	
• Blood other than bright red seen in or on the stools	• Suspect GI bleeds or IBD	
• Patients who have to reduce their haemorrhoids manually	• OTC treatment will not help	• As soon as practicable
• Severe pain associated with defecation	• Suggests anal fissure	

Evidence base for over-the-counter treatment

Diet

Reviews by Alonso-Coello et al. (2005, 2006a) have concluded that general dietary measures to prevent constipation help to decrease straining during defecation, ease the symptoms of haemorrhoids and reduce recurrence.

Pharmacologic intervention

Numerous products are marketed for the relief and treatment of haemorrhoids. These include a wide range of therapeutic agents and commonly include anaesthetics, astringents, corticosteroids and protectorants. Most products contain a combination of these agents.

The inclusion of such a diverse range of chemical entities appears to be based largely on theoretical grounds rather than any evidence base because almost no trials have been conducted.

Anaesthetics

Few studies appear to have been published to treat and relieve symptoms of haemorrhoids. A small study (n = 89) comparing two commercial ointment and suppository preparations containing hydrocortisone and cinchocaine (Uniroid, Proctosedyl) found that both products improved pain and itching (Smith & Moodie, 1988). Although the authors concluded that they were efficacious in most patients, given the poor quality of the trial design (e.g., open label) and the lack of placebo comparator, it is difficult to draw any conclusions about their efficacy. However, anaesthetics have proven efficacy when used on other mucosal surfaces; their

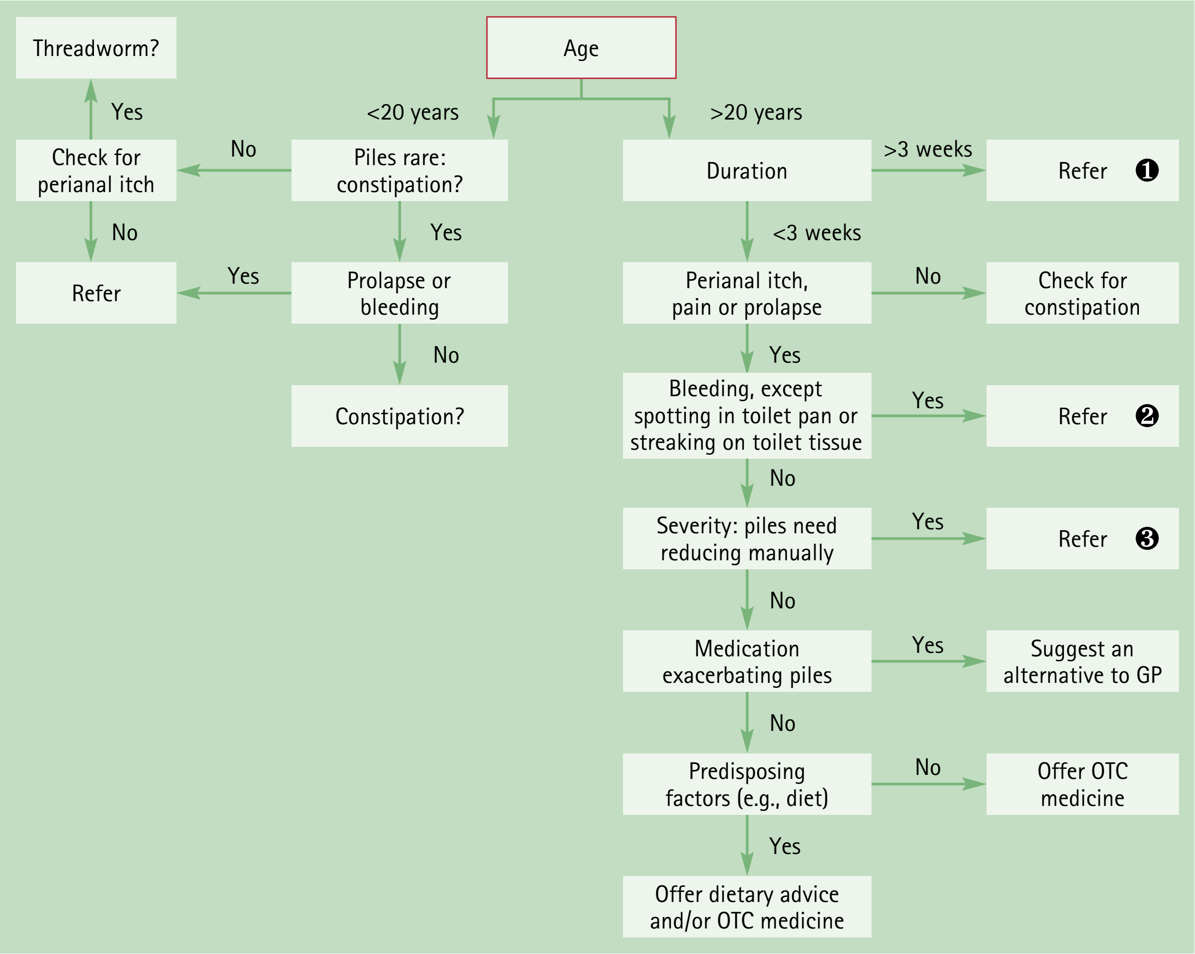
Threadworm?
Age
Yes
<20 years
>20 years
Check for perianal itch
No
Piles rare: constipation?
Duration
>3 weeks
Refer ❶
No
Yes
<3 weeks
Refer
Yes
Prolapse or bleeding
Perianal itch, pain or prolapse
No
Check for constipation
No
Yes
Constipation?
Bleeding, except spotting in toilet pan or streaking on toilet tissue
Yes
Refer ❷
No
Severity: piles need reducing manually
Yes
Refer ❸
No
Medication exacerbating piles
Yes
Suggest an alternative to GP
No
Predisposing factors (e.g., diet)
No
Offer OTC medicine
Yes
Offer dietary advice and/or OTC medicine

Fig. 8.19 Primer for the differential diagnosis of haemorrhoids.

❶ Duration. Patients with longstanding symptoms that have not been seen previously by a general practitioner (GP) should be referred to eliminate any underlying pathology. In the vast majority of cases, no sinister findings will result.

❷ Rectal bleeding. In most cases, rectal bleeding is a sign of conditions such as inflammatory bowel disease, malignancy, upper gastrointestinal bleeds and proctitis.

❸ Severity. Medication is unlikely to help any patient who has to reduce haemorrhoids manually. *OTC*, Over-the-counter.

use could therefore be justifiably recommended. Their action is short-lived and will produce temporary relief from perianal itching and pain. They require frequent application and might therefore cause skin sensitization.

Astringents (allantoin, bismuth, zinc, Peru balsam)

Astringents are included in haemorrhoid preparations on the theoretical basis that they precipitate surface proteins, thus producing a protective coat over the haemorrhoid. However, there appears to be no evidence to support this theory.

Antiinflammatory drugs

Steroids (e.g., hydrocortisone) have proven effectiveness in reducing inflammation and should therefore be useful in reducing haemorrhoidal swelling; however, trials with OTC products containing hydrocortisone appear not to have been undertaken.

Protectorants (e.g., shark liver oil)

Protectorants are claimed to provide a protective coating over the skin and thus produce temporary relief from pain and perianal itch. These claims cannot be substantiated, and as with astringents, any benefit conveyed by a protectorant is probably a placebo effect. In addition, it is questionable ethically that a product sourced from sharks with no efficacy should be used.

Other agents

Sclerosing agents (e.g., lauromacrogol) and wound-healing agents (e.g., yeast cell extract) can also be found in some products. There is no evidence supporting their effectiveness.

Flavonoids

Dietary supplementation with flavonoids is a common alternative treatment that is popular in continental Europe and the Far East. As an adjunct, their use has been shown to reduce acute symptoms and secondary haemorrhage after haemorrhoidectomy (Alonso-Coello et al., 2006b).

Summary

With so little data available on their effectiveness, it is impossible to say whether any product is a credible treatment for haemorrhoids, and many medical authorities regard them as little more than placebos. If used, it seems prudent to recommend products containing a local anaesthetic or hydrocortisone because they do have proven effectiveness in other conditions.

Treatment should only be recommended to patients with mild haemorrhoids. Any person complaining of prolapsing haemorrhoids, which need reducing by the patient, should be referred because these patients might require nonsurgical intervention with sclerotherapy or rubber band ligation. If these fail to effect a cure, a haemorrhoidectomy might be performed.

Practical prescribing and product selection

Strategies to relieve constipation

Patients should be asked about their normal diet to determine their fibre intake. Those with diets low in fibre should be encouraged to increase their fibre and fluid intake because this will help to produce softer stools and reduce constipation. Patients should try to eat more fruit, vegetables, bran and whole-grain bread. If this is not possible, fibre supplementation with a bulk-forming laxative could be recommended. Bulk-forming laxatives take 2 to 3 days to relieve constipation and may take up to 6 weeks to improve symptoms of haemorrhoids.

Haemorrhoidal products

The licenses all products allow them to be used in children older than 12 or 18 years of age. However, because haemorrhoids are unusual in young adults, it seems prudent to refer these patients for further evaluation. The standard dose for any formulation is twice daily plus an application after each bowel movement. Minimal side effects have been reported but are usually limited to slight irritation. They do not interact with any other medicines and can be used in pregnancy and breastfeeding. Products that contain hydrocortisone are subject to several licensing restrictions.

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Abdominal pain

Background

This section concentrates on conditions in which abdominal pain is the predominant symptom. The most common conditions seen by pharmacists are dyspepsia affecting the upper abdomen, primary dysmenorrhoea and IBS affecting the lower abdomen. These are covered in more detail elsewhere. However, other conditions present with abdominal pain and tend to be associated with the underlying anatomic structures (Fig. 8.20).

Prevalence and epidemiology

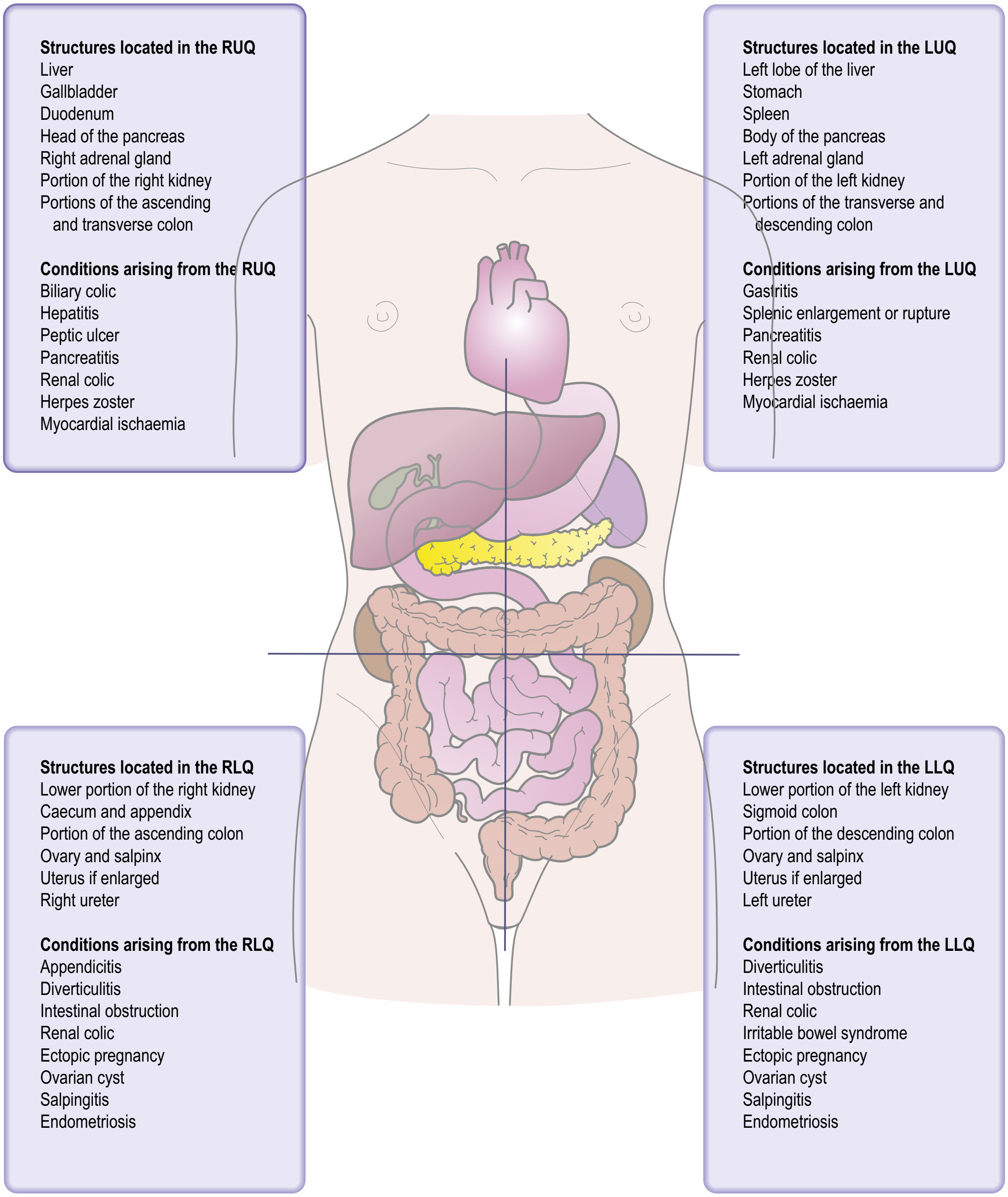
The prevalence and epidemiology of abdominal pain within the population are determined by the conditions that cause it. Because so many conditions can give rise to abdominal pain, it is likely that most of the population will, at some point, have from abdominal pain. For example, one study found that 40% of the UK population had dyspepsia during the previous 12 months.

Aetiology

Abdominal pain arises not only from the GI tract but also from the cardiovascular and musculoskeletal systems. GI tract causes include poor muscle tone leading to reflux (e.g., lower oesophageal sphincter incompetence), infections that cause peptic ulcers (from *H. pylori*) and mechanical blockages causing renal and biliary colic. Cardiovascular causes include angina and myocardial infarction (MI), whereas musculoskeletal problems often involve tearing of abdominal muscles.

Arriving at a differential diagnosis

Determining the cause of abdominal pain is not straightforward because people tend to present early with pain, often before other classical textbook symptoms associated with that condition manifest. Additionally, the low prevalence of serious disease (Table 8.28) and overlapping symptoms with minor illness make the task even more difficult. When possible, symptom clusters rather than a single symptom of pain should be established because single symptoms are generally poor predictors of final diagnosis. Asking specific questions relating to abdominal pain should be asked to help establish a differential diagnosis (Table 8.29).



Structures located in the RUQ
Liver
Gallbladder
Duodenum
Head of the pancreas
Right adrenal gland
Portion of the right kidney
Portions of the ascending and transverse colon

Conditions arising from the RUQ
Biliary colic
Hepatitis
Peptic ulcer
Pancreatitis
Renal colic
Herpes zoster
Myocardial ischaemia

Structures located in the LUQ
Left lobe of the liver
Stomach
Spleen
Body of the pancreas
Left adrenal gland
Portion of the left kidney
Portions of the transverse and descending colon

Conditions arising from the LUQ
Gastritis
Splenic enlargement or rupture
Pancreatitis
Renal colic
Herpes zoster
Myocardial ischaemia

Structures located in the RLQ
Lower portion of the right kidney
Caecum and appendix
Portion of the ascending colon
Ovary and salpinx
Uterus if enlarged
Right ureter

Conditions arising from the RLQ
Appendicitis
Diverticulitis
Intestinal obstruction
Renal colic
Ectopic pregnancy
Ovarian cyst
Salpingitis
Endometriosis

Structures located in the LLQ
Lower portion of the left kidney
Sigmoid colon
Portion of the descending colon
Ovary and salpinx
Uterus if enlarged
Left ureter

Conditions arising from the LLQ
Diverticulitis
Intestinal obstruction
Renal colic
Irritable bowel syndrome
Ectopic pregnancy
Ovarian cyst
Salpingitis
Endometriosis

Fig. 8.20 Anatomic location of organs and conditions that can cause abdominal pain. *LLQ*, Left lower quadrant; *LUQ*, left upper quadrant; *RLQ*, right lower quadrant; *RUQ*, right upper quadrant.

Conditions affecting the upper abdomen (apart from dyspepsia or gastritis)

Left upper quadrant pain

Splenic enlargement or rupture

If the spleen is enlarged, generalized left upper quadrant pain associated with abdominal fullness, and early feeding satiety is observed (Fig. 8.21). Referred pain to the left shoulder is sometimes seen. The condition is rare and is nearly always secondary to another primary cause, which might be an infection, a result of inflammation or haematologic.

Right upper quadrant pain

Biliary colic

Inflammation of the gallbladder usually occurs because of obstruction by a gallstone. The onset is sudden severe pain, which is constant and lasts several hours. The pain may radiate to the back or to the tip of the right scapula (Fig. 8.22). Tenderness with or without guarding is also present. Nausea, vomiting and fever are also common features. Risk factors for gallstones include increasing age, being female and obesity.

Table 8.28
Causes of abdominal pain

	Cause		
Probability	**Upper abdomen**	**Lower abdomen**	**Diffuse**
Most likely	Dyspepsia	Irritable bowel syndrome, primary dysmenorrhoea	Gastroenteritis
Likely	Peptic ulcers	Diverticulitis, endometriosis	Not applicable
Unlikely	Biliary and renal colic	Appendicitis, renal colic, ovarian cyst, pelvic inflammatory disease	Not applicable
Very unlikely	Splenic enlargement, hepatitis, myocardial infarction, perforated ulcer	Ectopic pregnancy, salpingitis, ovarian torsion, intestinal obstruction	Peritonitis

Table 8.29
Specific questions to ask the patient: Abdominal pain

Question	Relevance
Location of pain	• See Table 8.28.
Nature of the pain	• Heartburn is typically associated with a retrosternal burning sensation. • Cramplike pain is seen in diverticulitis, irritable bowel syndrome, salpingitis and gastroenteritis. • Colicky pain suggests appendicitis, biliary and renal colic, and intestinal obstruction. • Gnawing pain is associated with ulcers and pancreatitis.
Radiating pain	• Pain that radiates to the jaw, face and arm could be cardiovascular in origin. • Pain that moves from a central location to the right lower quadrant could suggest appendicitis. • Pain radiating to the back may suggest peptic ulcer or pancreatitis. • Pain radiating to the scapula may suggest biliary colic. • Pain radiating to left shoulder suggests splenic enlargement.
Aggravating or ameliorating factors	• Biliary colic can be aggravated by fatty foods. • Vomiting tends to relieve pain in gastric ulcers. • Pain in duodenal ulcer is relieved after ingestion of food. • Pain in salpingitis, peritonitis and appendicitis is often made worse by movement.
Associated symptoms	• Constipation highly associated with bowel obstruction. • Nausea and vomiting are common and seen in conditions such as biliary and renal colic, hepatitis, pancreatitis, appendicitis, intestinal obstruction and ovarian torsion.

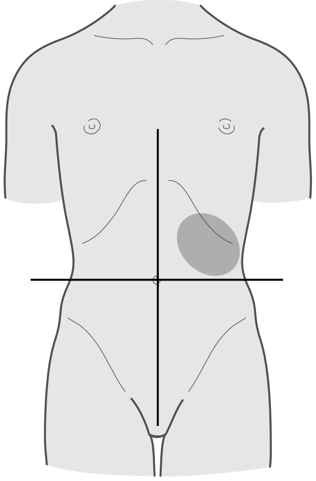


Fig. 8.21 The position of pain associated with splenic enlargement.

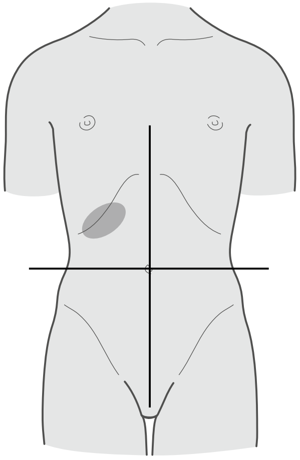


Fig. 8.22 The position of pain associated with acute cholecystitis and cholelithiasis.

Hepatitis

Liver enlargement from any type of hepatitis causes discomfort or dull pain around the right rib cage (Fig. 8.23). Associated early symptoms are general malaise, tiredness, pruritus and nausea. On examination, hepatic tenderness may be present.

Ulcers

Pain of ulcers are localized midepigastric pain described as constant, annoying or gnawing and boring (Fig. 8.24). In gastric ulcers, the pain is usually triggered by food (and not relieved by antacids) and experienced shortly after eating. In duodenal ulcers, the pain occurs 2 to 5 hours after meals, which is relieved by food and often awakens a person at night. Gastric ulcers are also more commonly associated with weight loss. A complication of a peptic ulcer is perforation. Symptom presentation of perforation is sudden severe epigastric pain, but pain can become more generalized and include the right lower quadrant

Pain affecting the right and left upper quadrants

Acute pancreatitis

The pain of pancreatitis develops suddenly and is described as agonizing and constant, with the pain being centrally located (epigastric) that often radiates into the back (Fig. 8.25). Pain reaches its maximum intensity within minutes and can last hours or days. Vomiting is common but does not relieve the pain. Early in the attack, patients might get relief from the pain by sitting forwards. It is commonly seen in those that misuse alcohol (25% of cases) or have gallstones (50% of cases). Patients are very unlikely to present in a community pharmacy because of the severity of the pain, but a mild attack could present with steady epigastric pain.

Renal colic

Urinary calculi (stones) can occur anywhere in the urinary tract, although stones usually get lodged in the ureter. Pain begins in the loin, radiating around the flank into the groin, sometimes down the inner side of the thigh (Fig. 8.26). Pain is very severe and colicky in nature. Attacks are spasmodic and tend to last minutes to hours; they often leave the person prostrate with pain. Symptoms of nausea and vomiting might also be present. It is twice as common in males than in females and usually occurs between the ages of 40 and 60 years.

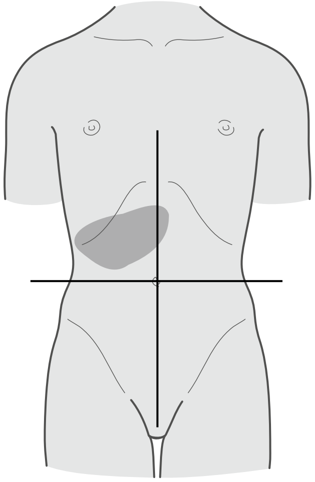


Fig. 8.23 The position of pain associated with hepatitis.

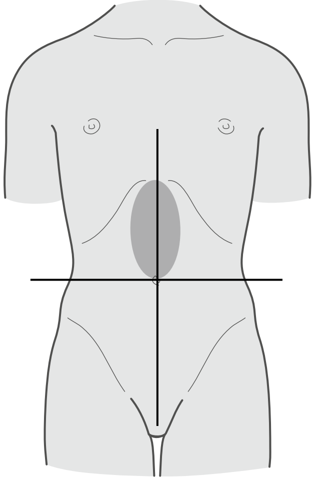


Fig. 8.25 The position of pain associated with pancreatitis.

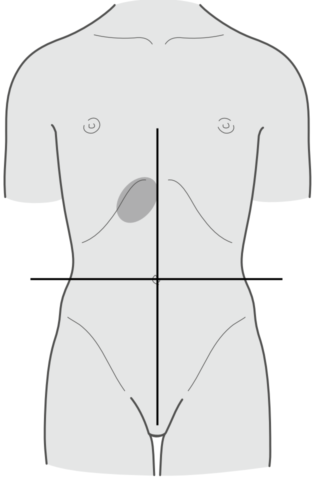


Fig. 8.24 The position of pain associated with ulcers.

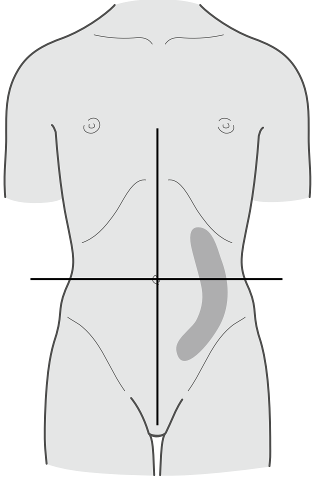


Fig. 8.26 The position of pain in renal colic.

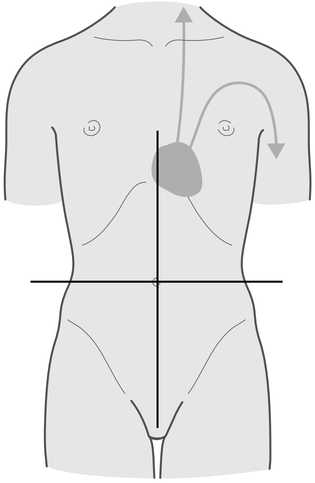


Fig. 8.27 The position of pain associated with myocardial ischaemia.

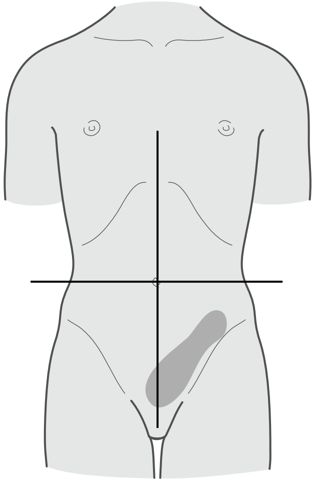


Fig. 8.29 The position of pain associated with diverticulitis.

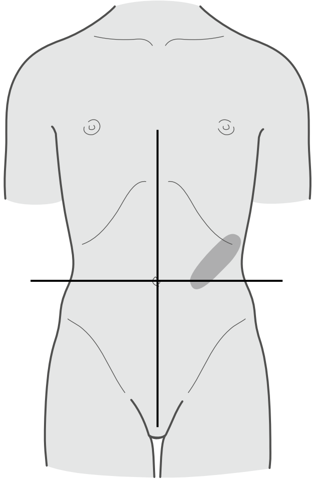


Fig. 8.28 The position of pain in herpes zoster.

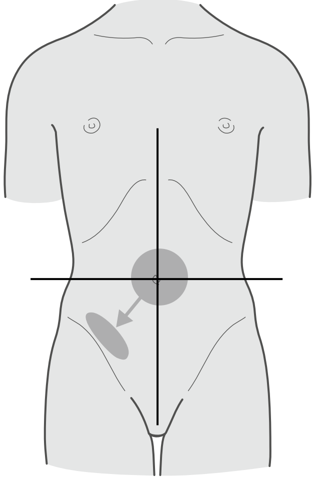


Fig. 8.30 The position of pain associated with appendicitis.

Myocardial ischaemia

Angina and MI cause chest pain that can be difficult to distinguish initially from epigastric or retrosternal pain caused by dyspepsia (Fig. 8.27). However, pain of cardiovascular origin often radiates to the neck, jaw and inner aspect of the left arm. Typically, angina pain is precipitated by exertion and subsides after a few minutes after being at rest. Pain associated with MI presents with characteristic deep crushing pain. The patient will appear pale, display weakness and be tachycardic. Cardiovascular pain should respond to sublingual glyceryl trinitrate therapy.

Herpes zoster (shingles)

Before the rash appears, there are usually prodromal symptoms. These include pain along the affected dermatome. The pain can be felt as a burning, stabbing or throbbing pain. Pain can be severe (Fig. 8.28).

Conditions affecting the lower abdomen (apart from irritable bowel syndrome)

Diverticulitis

Pain is more commonly seen in the left lower quadrant (Fig. 8.29) but can be suprapubic and occasionally in the right lower quadrant. Pain tends to be intermittent and cramplike in nature, with local tenderness and associated fever. Altered bowel habits are usual, with diarrhoea more common than constipation. The incidence of diverticulitis increases with increasing age. Most cases are seen in people older than the age of 50 years.

Appendicitis

Typically, the pain starts in the midabdominal region, around the umbilicus, before migrating to the right lower quadrant after a few hours (Fig. 8.30), although right-sided pain is experienced from the outset in about 50% of patients. The pain of appendicitis is described as colicky or cramplike, but after a few hours, it becomes constant. Movement tends to aggravate the pain, and vomiting might also be present. Appendicitis is most common during the early teenage years, especially in males.

Intestinal obstruction

Intestinal obstruction occurs in both the small and large intestine, although small bowel obstructions are more common. Pain, which is colicky and intermittent, is experienced around the umbilicus or in the lower quadrants. Tenderness is present. Vomiting and constipation are prominent features. It is most seen in those aged older than 50 years.

Diffuse abdominal pain

Gastroenteritis

Other symptoms of nausea, vomiting and diarrhoea are prominent. The patient might also have a fever and general malaise.

Peritonitis

This typically presents with severe persistent abdominal pain, which is worsened with movement. This is accompanied by intense rigidity of the abdominal wall, producing a boardlike appearance; fever and vomiting are common.

Conditions affecting females (other than primary dysmenorrhoea)

Ectopic pregnancy

Patients have persistent moderate to severe pain that is sudden in onset. Referred pain to the tip of the scapula is possible. Most patients (80%) experience bleeding that ranges from spotting to the equivalent of a menstrual period. Diarrhoea and vomiting are often also present.

Endometriosis

Patients experience lower abdominal aching pain that usually starts 5 to 7 days before menstruation begins and can be constant and severe. The pain often worsens at the onset of menstruation. Referred pain into the back and down the thighs is also possible. Patients may experience pain during or after sex and period-related GI and urinary symptoms.

Ovarian cyst

This is often asymptomatic but sometimes causes intermittent lower abdominal or pelvic pain. Other symptoms include pain during intercourse, urinary frequency and constipation.

Ovarian torsion

This usually presents with a sharp stabbing pain in the lower abdomen or pelvic area. Nausea and vomiting are common accompanying symptoms.

Pelvic inflammatory disease

This is associated with lower abdominal pain, which is generally bilateral, accompanied by abnormal vaginal discharge, intermenstrual bleeding, irregular menses and dyspareunia.

Salpingitis

This occurs predominantly in young, sexually active females, especially those fitted with intrauterine devices. Pain is usually bilateral, low and cramping. Fever and vaginal discharge are also predominant symptoms.

Fig. 8.31 will aid in the differentiation of the different types of abdominal pain.

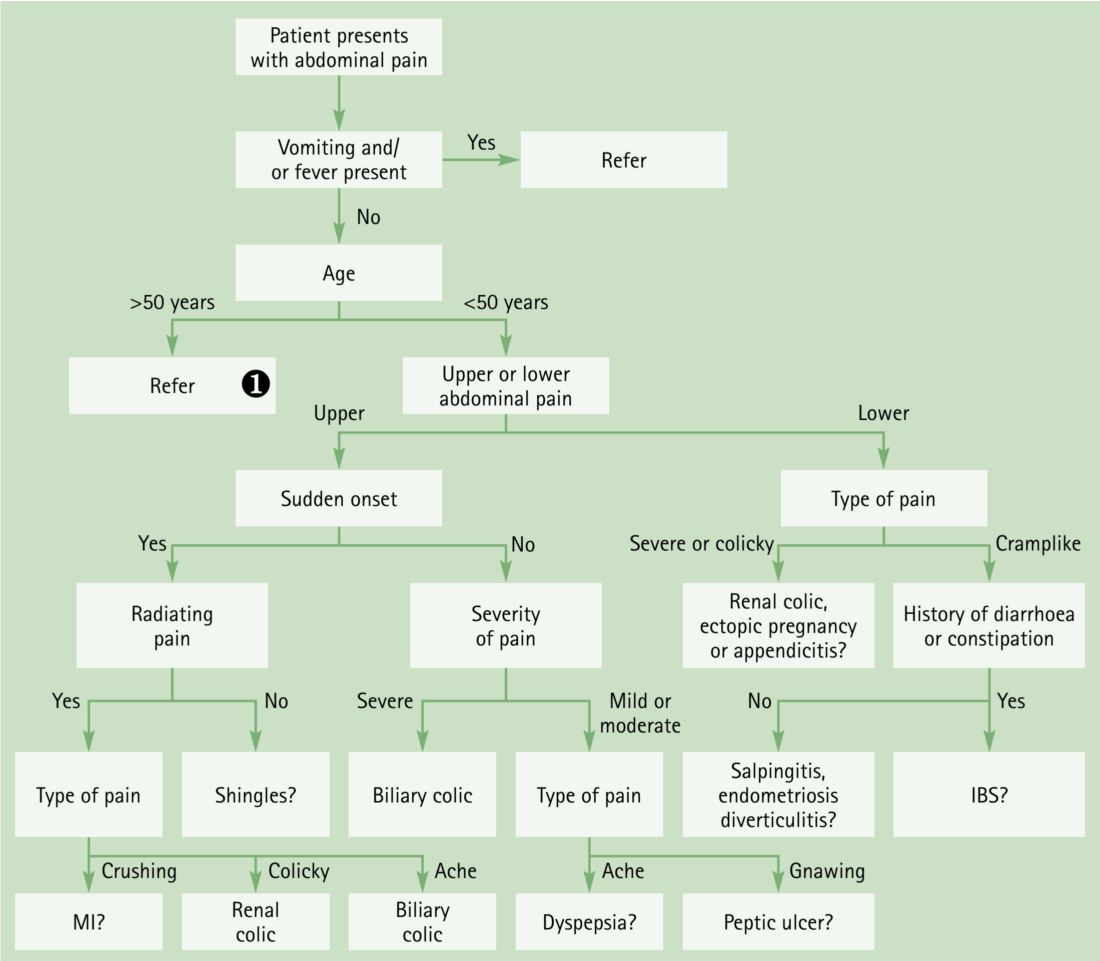

Patient presents with abdominal pain
Vomiting and/ or fever present
Yes
Refer
No
Age
>50 years
<50 years
Refer
❶
Upper or lower abdominal pain
Upper
Lower
Sudden onset
Type of pain
Yes
No
Severe or colicky
Cramplike
Radiating pain
Severity of pain
Renal colic, ectopic pregnancy or appendicitis?
History of diarrhoea or constipation
Yes
No
Severe
Mild or moderate
No
Yes
Type of pain
Shingles?
Biliary colic
Type of pain
Salpingitis, endometriosis diverticulitis?
IBS?
Crushing
Colicky
Ache
Ache
Gnawing
MI?
Renal colic
Biliary colic
Dyspepsia?
Peptic ulcer?

Fig. 8.31 Primer for the differential diagnosis of abdominal pain. *IBS,* Irritable bowel syndrome; *MI,* myocardial infarction.

Red flags indicative of referral: Abdominal pain

Reason for referral	Why referring	Timeframe for referral
Severe pain or pain that radiates	Suggests conditions such as peritonitis, pancreatitis, appendicitis, renal or biliary colic, perforated ulcer or cardiovascular origin	Immediate referral to a GP
Lower abdominal pain in pregnancy	Suggests ectopic pregnancy	
Abdominal pain with fever	Suggests diverticulitis, peritonitis, biliary colic or salpingitis	As soon as possible
Older adults	Diverticulitis and obstruction more common	

Evidence base for over-the-counter medication and practical prescribing and product selection

The three conditions that have abdominal pain and discomfort as one of the major presenting symptoms and can be treated OTC are dyspepsia, IBS and dysmenorrhoea. For further information on products used to treat these conditions, see other sections in this chapter.

Self-assessment questions

The following questions are intended to supplement the text. Two levels of questions are provided, multiple-choice questions and case studies. The multiple-choice questions are designed to test knowledge and application of knowledge, and the case studies allow this knowledge to be put in context in patient scenarios.

Multiple-choice questions

8.1 A 69-year-old female asks for your advice about her dentures; they do not seem to fit properly. You perform a visual inspection and observe a white patch near the base of her tongue. She has no pain. Based on this information, which ONE of the following is the most likely diagnosis?

- **a.** Leukoplakia
- **b.** Lichen planus
- **c.** Major aphthous ulcers
- **d.** MAUs
- **e.** Trauma-related ulcers

8.2 Miss Kandola presents with diarrhoea that she has had for 3 days. She complains of epigastric pain and bloating. You suspect giardiasis. Which ONE of the following questions would be most appropriate to help determine whether giardiasis was the cause?

- **a.** Recent foreign travel
- **b.** Ingestion of different food
- **c.** Contact with people with diarrhoea
- **d.** Recent history of blood in diarrhoea
- **e.** Diarrhoea in the early morning

8.3 In the treatment of constipation, which ONE of the following statements is true?

- **a.** Bulk-forming laxatives usually act within 12 to 24 hours.
- **b.** Senna tablets should be avoided in nursing mothers.
- **c.** Fybogel is not suitable for a patient with coeliac disease.
- **d.** Lactulose should not be taken by those with diabetes.
- **e.** Liquid paraffin has been linked as a cause of lipid pneumonia.

8.4 An adult patient presents with symptoms of abdominal pain and discomfort in the epigastric area. Which ONE of the following conditions is the least likely cause?

- **a.** Angina
- **b.** Duodenal ulcer
- **c.** Gastric ulcer
- **d.** Gastritis
- **e.** Oesophagitis

8.5 A 41-year-old female who has been diagnosed with irritable bowel syndrome has seen an advertisement for Buscopan IBS Relief. She asks for more information about the side effects of this product. Which ONE of the following is the least common side effect experienced with Buscopan IBS Relief (hyoscine)?

- **a.** Dry mouth
- **b.** Tachycardia
- **c.** Allergic skin reaction
- **d.** Urinary retention
- **e.** Anaphylactic reactions

8.6 Which ONE of the following symptoms is most indicative of renal colic?

- **a.** Loin pain radiating to the groin
- **b.** Left lower quadrant pain radiating to loin area
- **c.** Right lower quadrant pain radiating to loin area
- **d.** Back pain radiating to loin area
- **e.** Localized loin pain only

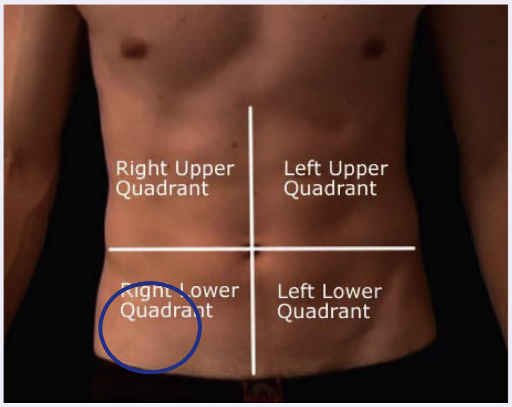
8.7 Which ONE of the following patient groups is most likely to have oral thrush?

- **a.** Denture wearers
- **b.** Patients with well-controlled diabetes
- **c.** Middle-aged adults
- **d.** Young children
- **e.** People with asthma using low-dose corticosteroids

8.8 Mrs Singh, 37 years old, asks for an indigestion remedy. She says she has been getting discomfort (points towards the area in the epigastric area) over the past few days. She has not noticed any other symptoms apart from a bit of wind. Which ONE of the following would be the most likely diagnosis?

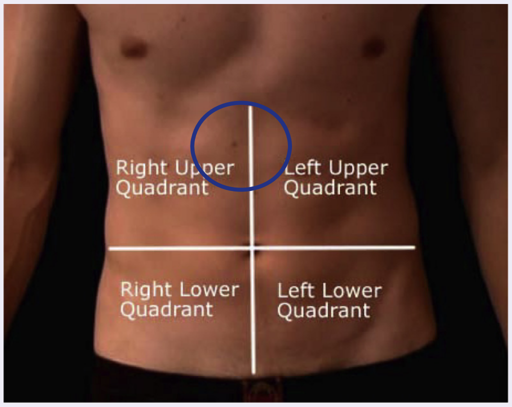
- **a.** Reflux
- **b.** Gastric ulcer
- **c.** Duodenal ulcer
- **d.** Nonulcer dyspepsia
- **e.** IBS

8.9 Based solely on location, which ONE of the following is the likely diagnosis for this 25-year-old patient?


Right Upper Quadrant
Left Upper Quadrant
Right Lower Quadrant
Left Lower Quadrant

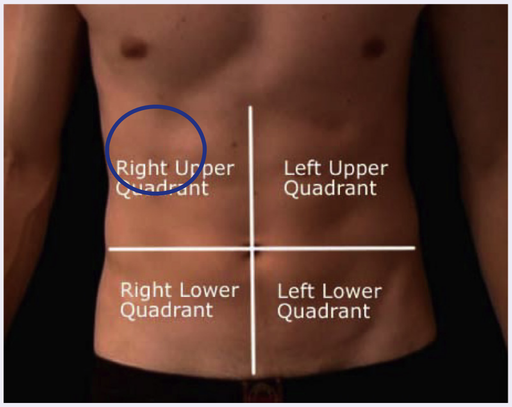
- **a.** IBS
- **b.** Peptic ulcer
- **c.** Renal colic
- **d.** Appendicitis
- **e.** Gallstones

8.10 Based solely on location, which ONE of the following is the likely diagnosis for this patient?


Right Upper Quadrant
Left Upper Quadrant
Right Lower Quadrant
Left Lower Quadrant

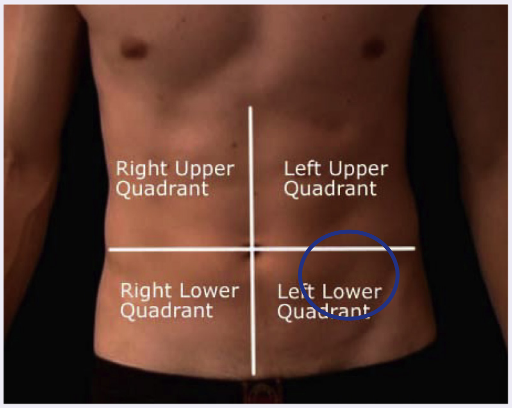
- **a.** IBS
- **b.** Peptic ulcer
- **c.** Renal colic
- **d.** Appendicitis
- **e.** Gallstones

8.11 Based solely on location, which ONE of the following is the likely diagnosis for this patient?


Right Upper Quadrant
Left Upper Quadrant
Right Lower Quadrant
Left Lower Quadrant

- **a.** IBS
- **b.** Peptic ulcer
- **c.** Renal colic
- **d.** Appendicitis
- **e.** Gallstones

8.12 Based solely on location, which ONE of the following is the likely diagnosis for this patient?


Right Upper Quadrant
Left Upper Quadrant
Right Lower Quadrant
Left Lower Quadrant

- **a.** IBS
- **b.** Peptic ulcer
- **c.** Pancreatitis
- **d.** Appendicitis
- **e.** Gallstones

8.13 A 14-year-old male and his mother ask for your advice about his sore mouth. You perform a visual inspection and observe two small circular lesions on the inside of the gums. They are painful. Based on this information, which ONE of the following is the most likely diagnosis?

a. Leukoplakia
b. Lichen planus
c. Major aphthous ulcers
d. MAUs
e. Trauma-related ulcers

8.14 Mr FT has come into your pharmacy with previously diagnosed haemorrhoids. Which ONE of the following symptoms would indicate referral to the doctor?

a. Bright red blood on the surface of the stool
b. Stools that are tarry
c. Perianal itching
d. Mucous discharge
e. Dull ache on defecation

8.15 Epigastric discomfort would be most closely associated with which ONE of the following conditions?

a. Appendicitis
b. Gastric ulcer
c. Diverticulitis
d. IBS
e. Renal colic

Questions 8.16 to 8.21 concern the following conditions:

A. IBS
B. Giardiasis
C. Pyelonephritis
D. Haemorrhoids
E. Reflux
F. Ulcerative colitis
G. Salpingitis
H. Appendicitis
I. Dyspepsia

Select, from A to I, which of the above is most associated with the following statements:

8.16 Nocturnal diarrhoea is sometimes seen

8.17 Tenderness is felt in the loin area

8.18 Is associated with retrosternal pain

8.19 Is associated with right lower quadrant pain

8.20 Is associated with left lower quadrant pain

8.21 Pain often starts centrally and then moves to the right lower quadrant

Questions 8.22 to 8.25 concern the following laxatives

A. Lactulose
B. Docusate sodium
C. Senna tablets
D. Macrogol oral powder
E. Ispaghula husk
F. Liquid paraffin

Select, from A to F, which statement is most appropriate:

8.22 Has the quickest onset of action

8.23 Can be given to children younger than 4 months

8.24 Is most associated with abdominal pain

8.25 Is no longer recommended

Answers

8.1 Answer: a

Rationale: Based on the observation that the lesion is painless, this eliminates minor (c) and major (d) ulcers as well as trauma-related ulcers (e). Because the person is an older adult and the lesion is described as a patch, this points to leukoplakia (a) because lichen planus (b) is seen in younger people and has a lacelike appearance.

8.2 Answer: a

Rationale: Giardiasis is a protozoan infection almost always contracted from subtropical climates. Therefore, enquiring about recent foreign travel (a) in this case would be most helpful; food ingestion (b) and close contact with others (c) could be helpful for establishing food poisoning. Blood in diarrhoea (d) and early morning rushes (e) would be more useful for IBD.

8.3 Answer: e

Rationale: Bulk-forming laxatives (a) have a slow onset of action and have no restrictions in use with patients with coeliac disease (c). Senna (b) is excreted in the breast milk but has not been shown to have any detrimental effects. Although lactulose (d) is a sugar, the dose normally used in constipation should not pose a problem for people with diabetes. However, there are reports of lipid pneumonia with liquid paraffin.

8.4 Answer: a

Rationale: All could present with pain in this area. Those of GI origin (b–e) will cause epigastric pain more commonly than that of cardiovascular origin.

8.5 Answer: d

Rationale: Dry mouth (a), tachycardia (b) and allergic skin reactions (c) are uncommon. Anaphylactic shock (e) is stated to be less than uncommon. Urinary retention is rare (d).

8.6 Answer: a

Rationale: Loin pain is associated with renal colic and typically radiates away from this area, so options b, c and d can be discounted. Typically, the pain radiates away from the loin area, so e can also be eliminated.

8.7 Answer: a

Rationale: Thrush can be precipitated with steroid inhalers (e) but is not common with low-dose inhalers. Infants rather than young children (d) are predisposed to thrush. Thrush is rare in adults, such as those with well-controlled diabetes (b) and middle-aged individuals (c).

8.8 Answer: d

Rationale: All listed conditions, other than IBS (e), present with epigastric symptoms. Reflux (a) is associated with a burning pain, and ulcers (b and c) are not associated with wind. Therefore, d is the most appropriate answer.

8.9 Answer: d

Rationale: Right lower quadrant pain is typically only seen in renal colic (c) and appendicitis (d). The person is young, so this suggests appendicitis more than renal colic.

8.10 Answer: b

Rationale: Pain experienced with IBS (a), renal colic (c) and appendicitis (d) would usually be in the lower quadrant. Gallstones (e) tend to be more in the right upper quadrant rather than in the central area, which is associated with peptic ulcer.

8.11 Answer: e

Rationale: See answer to 8.10.

8.12 Answer: a

Rationale: Pain experienced with IBS (a), pancreatitis (c) and appendicitis (d) would usually be in the lower quadrant. Appendicitis would be in the lower quadrant, and pancreatitis would be seen in both quadrants. IBS is much more associated with left lower quadrant pain.

8.13 Answer: d

Rationale: Leukoplakia (a) and lichen planus (b) are painless and tend not to present as circular lesions. Major ulcers (c) are large, and trauma-related ulcers (e) are irregular in shape.

8.14 Answer: b

Rationale: Blood mixed in stool should be referred to a GP to eliminate GI bleed. Slight rectal bleeding is often associated with haemorrhoids and can be visible in the toilet or on the surface of the stool (a). Perianal itching (c), mucous discharge (d) and a dull ache on defecation are typical symptoms of haemorrhoids.

8.15 Answer: b

Rationale: Only gastric ulcer would be associated with epigastric pain. Lower quadrant pain is seen in appendicitis (a), diverticulitis (c) and IBS (d). Loin pain is associated with renal colic (e).

8.16 Answer: f

Rationale: Diarrhoea is a common symptom associated with IBS (a), giardiasis (b) and ulcerative colitis (f). Periodicity of symptoms is not seen with giardiasis, and morning symptoms can be seen with IBS. IBD can show nocturnal symptoms.

8.17 Answer: c

Rationale: Pain felt in the loin area is often associated with kidney problems. From the list given, the only option consistent with pain in this region is pyelonephritis (c).

8.18 Answer: e

Rationale: Pain is a common feature in IBS (a), pyelonephritis (c), reflux (e), salpingitis (g) and appendicitis (h). Right lower quadrant pain is most closely associated with appendicitis. IBS is felt in the left lower quadrant. Pyelonephritis includes loin pain, and salpingitis tends to include diffuse lower quadrant pain.

8.19 Answer: h

Rationale: See answer 8.18.

8.20 Answer: a

Rationale: See answer 8.18.

8.21 Answer: h

Rationale: As stated in answer 8.18, appendicitis is associated with right lower quadrant pain, but in about 50% of people, the pain starts around the umbilicus.

8.22 Answer: c

Rationale: Stimulant laxatives are the quickest acting laxatives; only senna (c) from the list is a stimulant laxative.

8.23 Answer: b

Rationale: Only lactulose has a license for children younger than 1 year, although prescribing in this age group is not recommended.

8.24 Answer: c

Rationale: Flatulence is experienced with most laxatives, but stimulant laxatives (senna) are well recognized to cause abdominal pain.

8.25 Answer: f

Rationale: Liquid paraffin was traditionally a mainstay of treatment, but because of its adverse effects, it should not now be routinely used.

Case studies

CASE STUDY 8.1

Mrs SJ, a 28-year-old female, asks to speak to the pharmacist because she wants something for her stomachache that she has had on and off for the past few days. She points to an area on the upper right side of her abdomen around the rib cage.

a. Based solely on this location, what conditions could cause right upper quadrant pain?

It appears we are dealing with right upper quadrant pain, and the most likely conditions will be:
Biliary colic
Dyspepsia
Cardiovascular origin (e.g., MI)
Hepatitis
Pancreatitis
Peptic ulcers
Renal colic

b. Based on her age and prevalence of these conditions, which is uppermost in your thinking to form your initial hypothesis to test?

Dyspepsia

c. What further questions would you ask to help confirm your thinking?

Nature of pain
Severity of pain
Radiation of pain

She describes the pain as an 'ache', which is uncomfortable but not that bad that it is stopping her doing her normal day-to-day activities and that the pain is just in that one area.

d. How does this information help you with your differential diagnosis?

Her symptoms are indicative of dyspepsia and help to rule out the other possible causes:
Biliary and renal colic: severe pain and can radiate
Pancreatitis: severe pain
Cardiovascular origin: generally, the pain radiates

e. What further questions can be asked to further confirm your thinking and rule out those that could still be possibilities?

Timing of symptoms
Associated symptoms
Social history

Mrs SJ reports no other symptoms that are troubling her. Her job and home are fine with no recent changes. She says her symptoms seem to be shortly after eating, especially main meals.

f. Does this additional information change your thinking at all?

No. In fact, the absence of other symptoms helps to rule out hepatitis and ulcers.

You finally ask if she takes any prescribed or OTC medicines. She tells you she takes the following:
Atorvastatin 40 mg od: She has taken this for the past 3 years for familial hyperlipidaemia.
Paracetamol prn: She has taken this for 6 months for knee pain.
Naproxen 500 mg bd prn: She has taken this for 6 months for knee pain.

g. Which of these medications, if any, do you consider are contributing to Mrs SJ's pain?

Of the three medicines that Mrs SJ is taking, the one most likely to cause GI irritation is naproxen. However, she has been taking this for the past 6 months, and you would expect that dyspepsia symptoms would have been experienced already. It is then unlikely that naproxen has caused the problem unless the dose has recently been changed. Atorvastatin can also cause GI side effects but has been taken for the past 3 years and is therefore almost certainly not the cause of these symptoms. Paracetamol is not known to cause GI irritation, so it can also be ruled out. In conclusion, it is likely that none of the medicines has caused Mrs SJ's symptoms.

CASE STUDY 8.2

Mr LR, who is about 60 years old, presents to the pharmacy at lunchtime asking for something for diarrhoea. He says he has had the symptoms for the past 1 or 2 days. Every time he goes to the loo, he has very loose stools. He thought that the symptoms would settle down on their own, but he hasn't seen any improvement, so he wanted to get something to sort it out. He takes medication for arthritis and 'preventive things' for his heart because he had a mini-strike a couple of years ago.

a. State what the problem representation would be for this patient.

An adult older male, with comorbidities, presents with loose motions of acute onset.

b. Based on his age, what causes of diarrhoea can be initially discounted?

Predominantly seen in younger patients: IBS, IBD, malabsorption problems, Addison disease
Predominantly seen in older patients: faecal impaction

c. Based on the problem representation and his age, what would be your hypothesis as to the cause of his diarrhoea?

Diarrhoea of infective origin

d. What further information would you need to test this hypothesis?

Frequency of loose motions versus normal bowel habit
Associated symptoms
Previous history

He tells you that he has been going to the toilet three or four times a day compared with his normal routine of once or twice a day. He has been getting cramping stomach pains and generally doesn't feel 100%. He has had the odd bout of diarrhoea before but not for a long time now.

e. Based on this information, what is your differential diagnosis?

It appears that your original hypothesis of an infective cause is correct because it appears to be a one-of acute episode, thus helping to rule out chronic causes such as diabetes or hypothyroidism.
You know he takes medicines. Medicines are a common cause of diarrhoea, so it would be worth considering if an Adverse Drug Reaction is responsible.

f. What factors would lead you to consider an ADR as the cause of his symptoms?

Recent introduction of a new medicine or a dose change

g. What safety netting are you going to put in place?

You tell Mr RL you think the diarrhoea is an infection of some kind. These usually resolve in a few days, so you would expect to see his symptoms start to improve over the next day or so. You tell him that dehydration can occur with diarrhoea and advise him to keep hydrated by drinking more fluids than usual. An oral rehydration product could be recommended. You tell him that if his symptoms have not resolved in 2 days, then he should be reassessed.

CASE STUDY 8.3

Mrs RH, an older patient about 75 years old, picks up her prescription. She is well known to you and often asks for advice about his medicines. However, today she wants you to look at a funny patch on the inside of her cheek that he noticed a couple of weeks ago. She says it does not bother her but would just like to clear it up.

a. State what the problem representation would be for this patient.

An older female presents with painless lesion in her mouth of recent onset.

b. Based on the problem representation, what would be your hypothesis as to the cause of her diarrhoea?

Oral thrush
Leukoplakia
Lichen planus

c. Based on location, which one of the three conditions is more likely?

All three problems can be on the buccal mucosa, so the location is not particularly discriminatory.

d. What questions will you ask to differentiate between these three possibilities?

Denture wearer: predisposed to thrush
Smoking history: predisposed to leukoplakia
Skin rash: associated with lichen planus

She tells you that she hasn't noticed any rash on her body but does wear dentures and used to smoke but gave up a few years ago.

e. How does this help your differential diagnosis?

Although lichen planus can present with oral symptoms only, it is unusual, so lichen planus can be discounted at this time.

You inspect the lesion and find it to be a solid white patch about the size of a 5 pence piece. There appears to be no underlying redness.

f. What are your thoughts now?

Lichen planus can be discounted. Thrush also now seems less likely. The differential diagnosis points toward leukoplakia and is consistent with her age.

Immunocompetent patients are known to be at risk of thrush. Your records show she takes ibuprofen 600 mg tds; aspirin 75 mg od and atenolol 25 mg od.

g. Are her medicines implicated in the oral lesion?

She takes nothing for conditions such as diabetes or cancer that may make her immunocompromised and further suggests that thrush is not the cause of the lesion.

You are relatively confident with the differential diagnosis of leukoplakia.

h. What safety netting are you going to put in place?

Tell her what you think the problem is and that you cannot give her anything for it. Tell what she needs to see the doctor to confirm the diagnosis because although almost all are benign and not serious, in a very few cases, they can develop into cancer.

Chapter 9

Dermatology

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Background

The skin is the largest organ of the body. It has a complex structure and performs many important functions. These include protecting underlying tissues from external injury and overexposure to ultraviolet (UV) light; barring entry to microorganisms and harmful chemicals; acting as a sensory organ for pressure, touch, temperature, pain and vibration; and maintaining the homeostatic balance of body temperature.

It has been reported that dermatologic disorders account for up to 15% of the workload of UK family doctors, with upwards of 25% of patients attending their general practitioners (GPs) about skin complaints each given year. Statistics for community pharmacy are more difficult to establish, but observational studies reveal a similar level of symptom presentation.

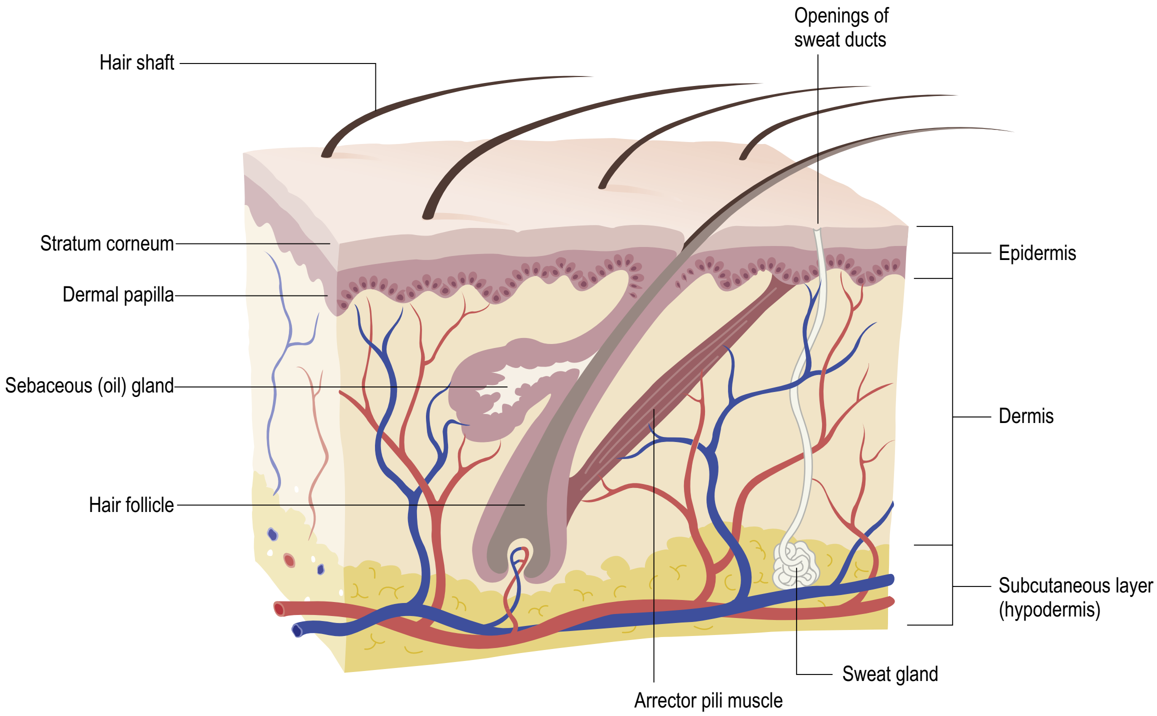

Fig. 9.1 The epidermis, dermis and associated structures.

General overview of skin anatomy

Principally, the skin consists of two parts, the outer and thinner layer called the epidermis and an inner thicker layer named the dermis. Beneath the dermis lies a subcutaneous layer, known as the hypodermis (Fig. 9.1).

The epidermis

The epidermis is the major protective layer of the skin and has four distinct layers when viewed under the microscope. The basal layer actively undergoes cell division, forcing new cells to move up through the epidermis and form the outer keratinized horny layer. This process is continuous and takes approximately 35 days. Pathological changes in the epidermis can produce lesions with abnormal scale or loss of surface integrity. It is also responsible for skin pigmentation because melanocytes, which produce melanin, are located in the lower epidermis.

The dermis

Most of the dermis is made of connective tissue: collagen for strength and elastic fibres to allow stretch. It provides support to the epidermis as well as its blood and nerve supply. Located in the dermis are the hair follicle, sebaceous and sweat glands and arrector pili muscle. Conditions of the dermis usually result in changes in the elevation of the skin (e.g., papules and nodules).

The hair

Each hair consists of a shaft, the visible part of the hair, and a root. Surrounding the root is the hair follicle, the base of which is enlarged into a bulb structure. The arrector pili muscle, when contracted pulls, the hair into a vertical position to provide thermal protection, causing ‘goosebumps’. The primary function of hair is protection.

Sebaceous glands

Sebaceous glands are found in large numbers on the face, chest and upper back. Their primary role is to produce sebum, which keeps hair supple and the skin soft. During puberty, these glands become large and active because of hormonal changes. Frequently, sebum accumulates in the sebaceous glands and is one of the factors that leads to acne formation.

Sweat glands

These are the most numerous of the skin glands and are classed as apocrine or eccrine. Eccrine glands produce a transparent watery liquid (sweat), are located all over the body and play a role in the elimination of waste products and maintaining a constant core temperature. Apocrine sweat glands are mainly located in the axilla, begin to function at puberty and have no known biological function.

Terminology describing pathological skin changes can be confusing; the more common terms used to describe their appearance are shown in Table 9.1.

History taking

Unlike internal medicine, most dermatologic complaints presenting in a community pharmacy can be seen. This affords an excellent opportunity to base the differential diagnosis not only on questioning but also on a physical examination. General questions that

Table 9.1
Common terms used to describe skin lesions

Term	Description
Macule	A flat lesion <1 cm in diameter
Patch	A flat lesion >1 cm in diameter
Papule	A raised solid lesion <1 cm in diameter
Nodule	A raised solid lesion >1 cm in diameter
Vesicle	A clear, fluid-filled lesion lasting a few days, <1 cm in diameter
Bulla	A clear, fluid-filled lesion lasting a few days, >1 cm in diameter
Pustule	A pus-filled lesion lasting a few days, <1 cm in diameter
Comedone	A papule plugged with keratin and sebum
Erythema	Redness caused by dilated blood vessels that blanch when pressed
Excoriation	Localized damage to the skin caused by scratching
Lichenification	Thickening of the epidermis with increased skin markings caused by scratching

should be considered when dealing with dermatologic conditions are listed in Table 9.2.

Physical examination

When possible the skin should always be examined rather than relying on patient descriptions. Before the examination, it is important to clearly explain the procedure you want to perform and gain the person's consent. Examinations should ideally be conducted in a consultation room. It is worth remembering that many patients are embarrassed by the appearance of their skin, so empathy must be exercised during the consultation. When looking at skin lesions, number of factors can be characteristic of certain conditions (Table 9.3). There is no substitute for experience when recognizing skin problems. This is normally gained through seeing multiple similar cases, but a free image bank (http://www.dermnet.com) is available, from which familiarity can be gained.

Hyperproliferative disorders

Background

Hyperproliferative disorders are characterized by a combination of increased cell turnover rate and a shortening of the time it takes

Table 9.2
Questions to consider when taking a dermatologic history

Question	Relevance

When did the problem first appear?	• Ascertains if dealing with acute or chronic problem.
	  • Infectious causes tend to be acute.
	  • A history of skin rash should be present in chronic conditions, but these can relapse and remit (e.g., dermatitis, psoriasis).

Where did the problem first appear?	• Certain skin problems start in one location before spreading to other parts of the body (e.g., chickenpox usually starts on the face before spreading to the trunk and limbs). • Patients might need prompting to tell you where the problem started because they are likely to want help for the most obvious or large skin lesion but neglect to tell you about smaller lesions that appeared first.

Are there symptoms other than rash?	• Systemic symptoms can be present (e.g., fever and malaise and suggests infection).
	• Itch is associated with many skin conditions:
	  • Mild itch is associated with conditions such as psoriasis, impetigo and medicine eruptions.
	  • Moderate itch is associated with tinea.
	  • Severe itch is associated with conditions such as scabies and atopic and contact dermatitis.

Is there family, occupational or close contact history?	• A family history is often present in those with psoriasis or atopic dermatitis. • Exposure to irritants or allergens can trigger conditions such as dermatitis. • Transmission of scabies occurs through close contact.
What is the general medical history?	Many skin signs can be the first marker of internal disease: • Generalized pruritus can be a sign of diabetes or liver dysfunction. • Malabsorption syndromes can present with dermatitis-like lesions.
Has the person travelled?	• More people are taking holidays to non-Western countries and therefore have the potential to contract conditions usually associated with tropical climates. These may include pityriasis versicolor or Zika virus.

Table 9.3
Things to consider when performing a dermatologic examination

Lesion	Relevance
Temperature	Use the backs of your fingers to make the assessment. This should enable you to identify generalized warmth or coolness of the skin and note the temperature of any red areas. ● Generalized warmth can indicate infection. ● Localized warmth might indicate inflammation or cellulitis.
Lesions	● Distribution ● Symmetrical, such as acne and psoriasis ● Asymmetrical, e.g., tinea corporis or contact dermatitis ● Unilateral, e.g., shingles ● Localized, e.g., nappy rash ● Arrangement ● Discrete (with healthy skin in between), e.g., psoriasis ● Coalescing (merging together), e.g., eczema ● Grouped, e.g., insect bites ● Feel of lesions ● Smooth, e.g., urticaria ● Rough, e.g., actinic keratosis
Recent trauma	● Is there any sign that individual lesions have developed on a site of trauma or injury such as a scratch? This is seen in a number of conditions such as psoriasis and warts.

for cells to migrate from the basal layer to the outer horny layer. Typically, the cell turnover rate is 10 times faster than normal, and cell migration takes 3 or 4 days rather than 35 days.

Psoriasis

Background

Psoriasis is a chronic, relapsing, inflammatory disorder characterized by a variety of morphologic lesions that present in a number of forms. Depending on the extent and severity of lesions, psoriasis can have a profound effect on a person's work and social life, with increased levels of anxiety and depression.

Prevalence and epidemiology

Psoriasis is a common skin disorder, with an estimated worldwide prevalence between 1% and 3%. In the United Kingdom, it has been reported to affect 1% to 2% of the population. However, this is probably an underestimate because some patients with mild psoriasis may not present to a healthcare professional. Psoriasis can present at any time in life, although it appears to be more prevalent in the second and fifth decades. It is rare in infants and uncommon in children. The sexes are equally affected, and it is more common in Whites. Most people with psoriasis have a positive family history.

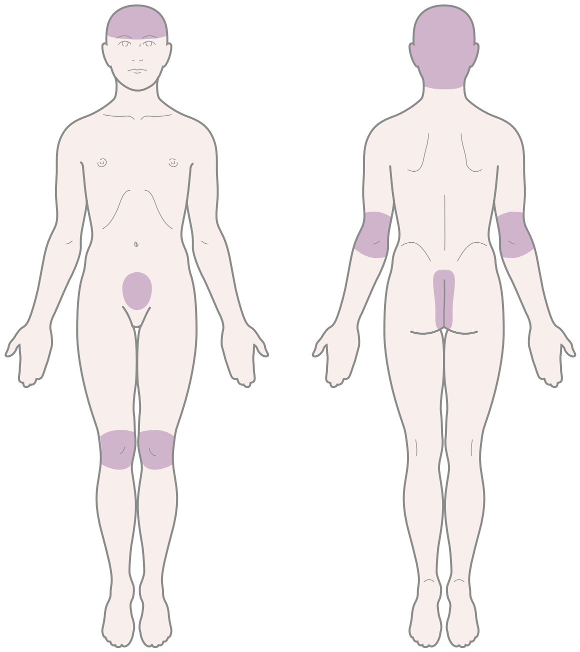

Fig. 9.2 Typical distribution of psoriatic plaques.

Aetiology

The exact cause of psoriasis remains unclear, but it is now recognized as an immune-mediated disorder with a genetic influence. Studies have identified a region on chromosome 6 as a contributor to psoriasis susceptibility (known as *PSORS1*), and this has been associated with at least 50% of psoriasis cases in several populations. However, genetic predisposition to psoriasis does not necessarily mean disease expression. Studies in twins also suggest that environmental factors might be needed for clinical expression of the disease because only 70% of genetically identical twins both develop the condition. Psoriasis lesions also develop at sites of skin trauma, such as sunburn and cuts (known as the *Koebner phenomenon*), after streptococcal throat infection (guttate psoriasis) and during periods of stress.

Arriving at a differential diagnosis

Psoriasis can be located on various parts of the body (Fig. 9.2) and presents in a variety of different forms. Plaque and scalp psoriasis are the only forms of the condition that can be managed by community pharmacists. It is therefore necessary that other forms of psoriasis and conditions that look like psoriasis can be recognized and distinguished (Table 9.4). Asking symptom-specific questions helps to establish a differential diagnosis (Table 9.5).

Clinical features of plaque psoriasis

This is the most common form of psoriasis, accounting for about 80% to 90% of cases.

Plaque psoriasis is typically distributed symmetrically and presents with characteristic salmon-pink lesions with silvery-white scales and well-defined boundaries (Fig. 9.3). On darker skin, this characteristic colour is not apparent. Lesions can be single or multiple and vary in size from pinpoint to covering extensive areas. If the scales on the surface of the plaque are gently removed, it will reveal pinpoint bleeding points from the superficial dilated capillaries. This is known as the Auspitz sign and is diagnostic.

Table 9.4
Causes of psoriasis-like rash and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	Plaque psoriasis Scalp psoriasis
Likely	Medicine induced Seborrhoeic dermatitis
Unlikely	Cellulitis Dermatitis Flexural psoriasis Guttate psoriasis Lichen planus Pityriasis rosea Pustular psoriasis Tinea corporis
Very unlikely	Erythrodermic psoriasis Tinea capitis

Clinical features of scalp psoriasis

Scalp psoriasis affects upwards of 90% of people with psoriasis. It can be mild, exhibiting slight redness of the scalp, to severe, with total head involvement, marked inflammation and thick scaling (Fig. 9.4). Itch is common. The redness often extends beyond the hair margin and is commonly seen behind the ears.

Conditions to eliminate

Likely causes

Medication-induced or -exacerbated psoriasis

A number of medicines can precipitate, worsen, or aggravate existing psoriasis. Medicines most associated are lithium, antimalarials, beta-blockers, angiotensin-converting-enzyme (ACE) inhibitors and nonsteroidal antiinflammatory drugs. Other medicines with a reported association with psoriasis include digoxin, clonidine, amiodarone, gold, tumour necrosis factor-α) inhibitors, fluoxetine, cimetidine, antibacterials (tetracycline and penicillin) and gemfibrozil (Kim & Del Rosso, 2010). Sudden withdrawal of corticosteroids can also precipitate psoriasis.

Table 9.5
Specific questions to ask the patient: Psoriasis

Question	Relevance
Onset	Psoriasis can develop in patients of any age, although it first occurs most commonly in early adult life. However, in young and older patients, the lesions tend to be atypical, which can make the diagnosis more difficult.
Distribution of rash	Psoriasis often presents in a symmetrical distribution and most commonly involves the scalp and extensor aspects of the elbows and knees. The gluteal cleft and umbilicus can also be affected (see Fig. 9.2). Lichen planus often presents on the inside of the wrists. Pityriasis rosea affects the thighs and trunk. Cellulitis is usually seen on the lower limbs.
Other symptoms	Itch is not normally the predominant feature of psoriasis, unlike other conditions such as dermatitis and fungal infections. Oral involvement is sometimes seen in lichen planus. Prodromal symptoms are associated with pityriasis rosea. Nail involvement in the form of pitting (see Fig. 9.25). and onycholysis (separation of the nail plate from the nail bed) is normally observed in patients with long-standing psoriasis.
Look of rash	Plaque psoriasis usually show scaling as an obvious feature. This is not seen with skin conditions such as cellulitis and dermatitis. Central clearing is associated with fungal infection. When scalp involvement is mild, psoriasis can be impossible to distinguish from seborrhoeic dermatitis.
Previous history of lesions	Psoriasis is a chronic relapsing and remitting disease, and it is likely that the patient will have had lesions in the past. Infections are usually acute, and patients do not show a history of the problem.

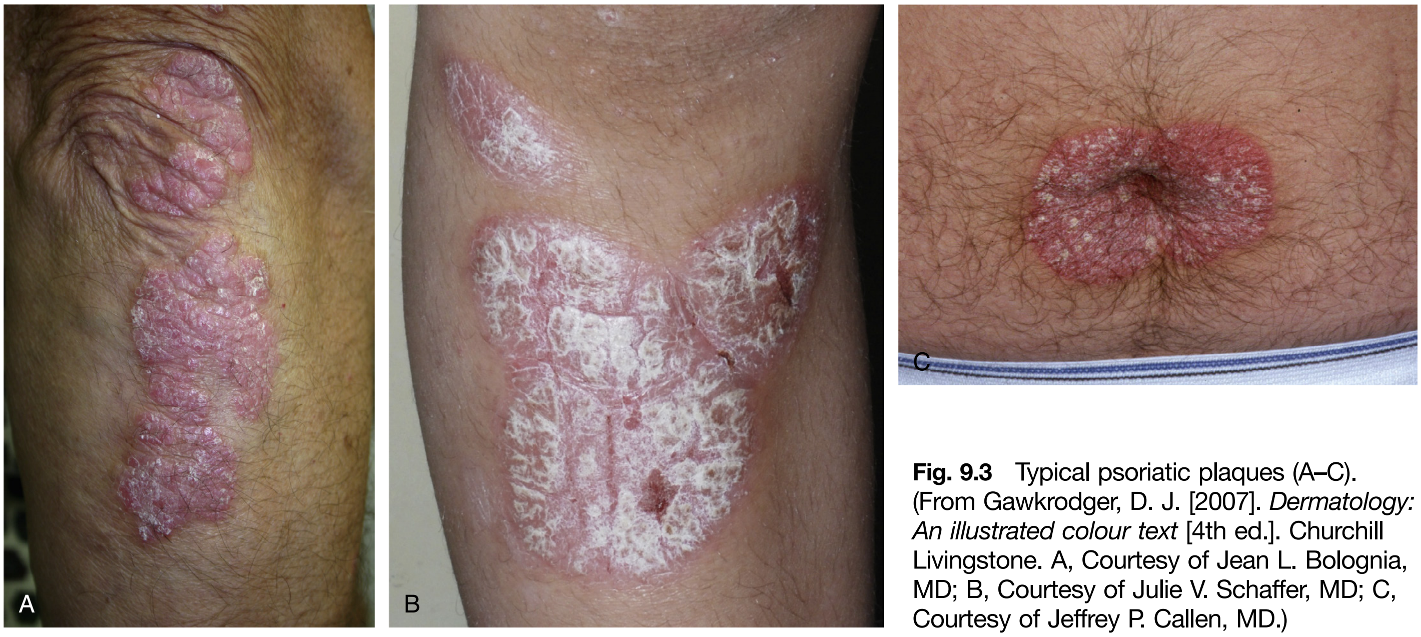

Fig. 9.3 Typical psoriatic plaques (A–C). (From Gawkrodger, D. J. [2007]. *Dermatology: An illustrated colour text* [4th ed.]. Churchill Livingstone. A, Courtesy of Jean L. Bolognia, MD; B, Courtesy of Julie V. Schaffer, MD; C, Courtesy of Jeffrey P. Callen, MD.)

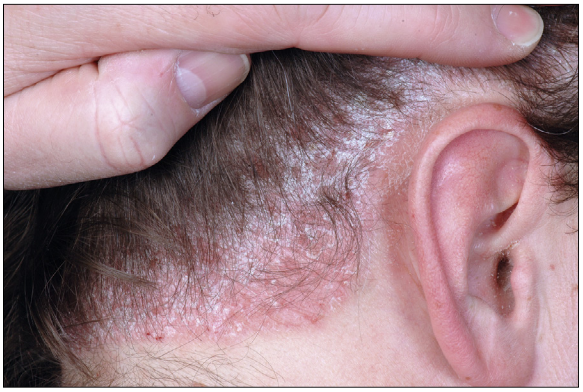

Fig. 9.4 Scaly plaques of psoriasis in the scalp, with localized hair loss. (From Gawkrodger, D. J. [2007]. *Dermatology: An illustrated colour text* [4th ed.]. Churchill Livingstone. *Rheumatology*, 8th ed., 2023.)

Seborrhoeic dermatitis

Mild scalp psoriasis can be very difficult to distinguish from seborrhoeic dermatitis. However, in practice, this is rarely a problem because treatment for both conditions is often the same.

Unlikely causes

Cellulitis

This is characterized by erythema that can superficially resemble psoriasis. However, redness is generally diffuse, lacking a defined margin, and usually affects a single lower limb. Additionally, pain and swelling are often present, and on physical examination, there is normally an obvious skin break where the invading pathogen will have gained entry. Systemic symptoms are also normally seen.

Dermatitis

Dermatitis can mimic chronic plaque psoriasis because the skin tends to become lichenified and resemble scaling in psoriasis. Lesions are asymmetric, and itch is a prominent symptom.

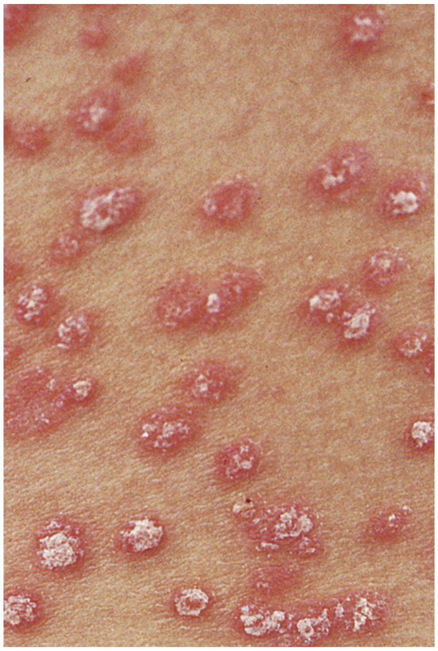

Fig. 9.5 Guttate psoriasis. (From Wilkinson, J., Shaw, S., & Orton, D. [2004]. *Dermatology in focus.* Churchill Livingstone.)

Flexural psoriasis

Lesions of flexural psoriasis resemble plaque psoriasis but lack scaling and have an atypical distribution, namely, in the body folds, especially the groins and axillae. Itching is more prominent and affects more than 50% of people.

Guttate psoriasis (also known as raindrop psoriasis)

Guttate psoriasis is characterized by crops of scattered small lesions (<1 cm) covered with light flaky scales that particularly affect the trunk and proximal part of the limbs (Fig. 9.5). This form of psoriasis usually occurs in adolescents and often follows a streptococcal

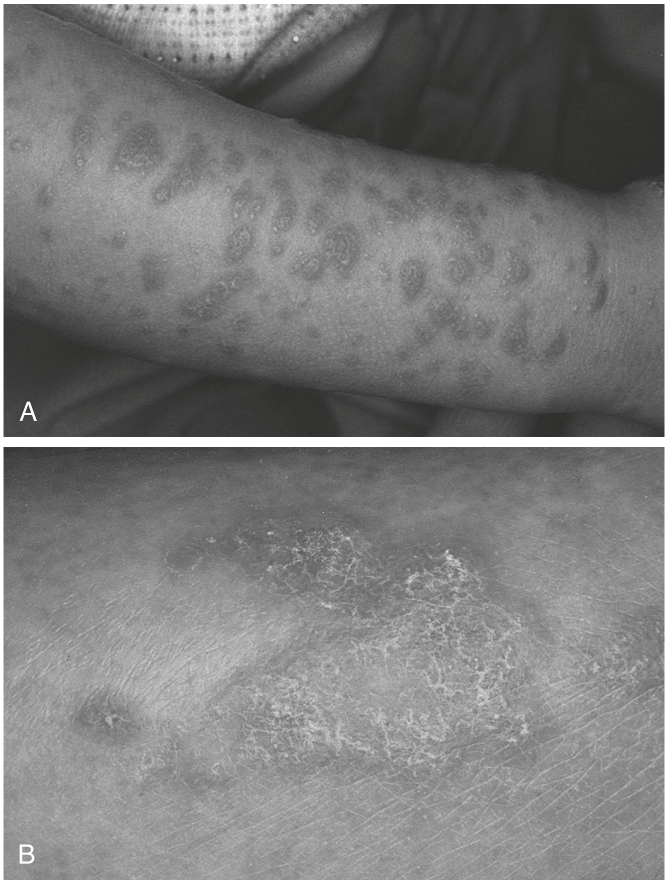

Fig. 9.6 lichen planus (A and B). (From Swartz, M. H. [2014]. *Textbook of physical diagnosis, history and examination* [7th ed.]. Saunders.)

throat infection or in people genetically predisposed to psoriasis. The condition is usually self-limiting.

Lichen planus

The rash appears as a shiny, slightly raised pink or purple-red small lesions and can show fine white streaks (Wickham striae) on their surfaces and are similar in appearance to plaque psoriasis (Fig. 9.6). The rash can be anywhere but mostly affects the insides of the wrists, around the ankles and on the lower back. Itch maybe absent, but it usually itches, which can be severe. Lichen planus usually occurs in adults aged 40 to 60 years. Additionally, oral mucous membranes can be affected (~20% of patients) with white, slightly raised lesions that look a little like a spider's web. The person will not have a family history of psoriasis. Lichen planus is an uncommon condition and is reported to account for fewer than 1.0% of dermatologic outpatient consultations.

Pityriasis rosea

This condition is characterized by multiple discrete circular or oval lesions that show erythematous scaling mainly on the trunk but also on the thighs and upper arms and exhibit symmetry. The colour of the rash in Whites tends to be a lighter pink than psoriasis and can be mildly itchy (Fig. 9.7). In people who have dark skin, the patches may leave areas of darker or lighter pigmentation. A target disc lesion (herald patch) normally appears on the trunk a few days before the generalized rash. It most commonly affects young adults. Prodromal symptoms of fever and headache can be experienced before rash. The condition usually remits spontaneously after 4 to 8 weeks. An accurate history will normally eliminate pityriasis rosea from psoriasis because the condition is acute in onset, and the patient can often identify the initial target lesion.

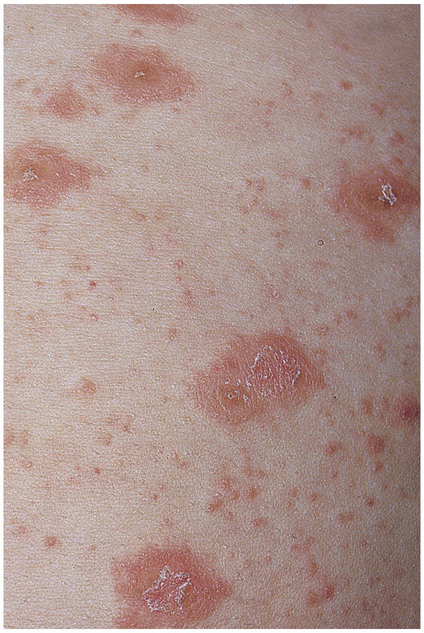

Fig. 9.7 Pityriasis rosea. (From [2021]. *Habif's clinical dermatology: A color guide to diagnosis and therapy* [7th ed.]. Elsevier.)

Pustular psoriasis (localized)

In this form of psoriasis, sterile pustules are an obvious clinical feature. The pustules tend to be located on the advancing edge of the lesions and typically occur on the palms of the hands and soles of the feet (Fig. 9.8). It is more common in females than males.

Tinea corporis

Tinea corporis can superficially look like plaque psoriasis. Initial presentation is of a single circular raised lesion with a scaly leading edge. For further information on tinea infection, refer to the fungal infection section later in the chapter.

Very unlikely causes

Erythrodermic psoriasis

Erythrodermic psoriasis presents as an extensive erythema and shows very few typical lesions. It is therefore difficult to diagnose. Systemic symptoms can be severe and include fever, malaise, joint pain and diarrhoea. The condition is serious and can even be life threatening. Patients are extremely unlikely to present at a community pharmacy.

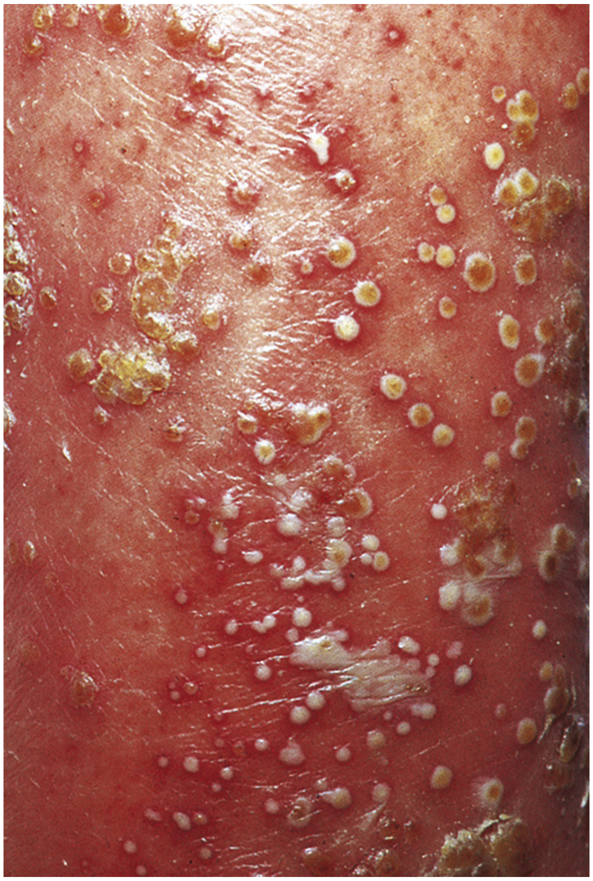

Fig. 9.8 Pustular psoriasis. (From Wilkinson, J., Shaw, S., & Orton, D. [2004]. *Dermatology in focus.* Churchill Livingstone.)

Tinea capitis (fungal infection of the scalp)

Symptoms are characterized by scaling and itching of the scalp, broken hairs and patches of alopecia. The scalp may show a black dot appearance caused by broken-off hair stubs and a degree of erythema (Fig. 9.9). Tinea capitis is the most common infection in children worldwide, but it is rare in Western nations.

Fig. 9.10 will aid in the differentiation of plaque psoriasis.

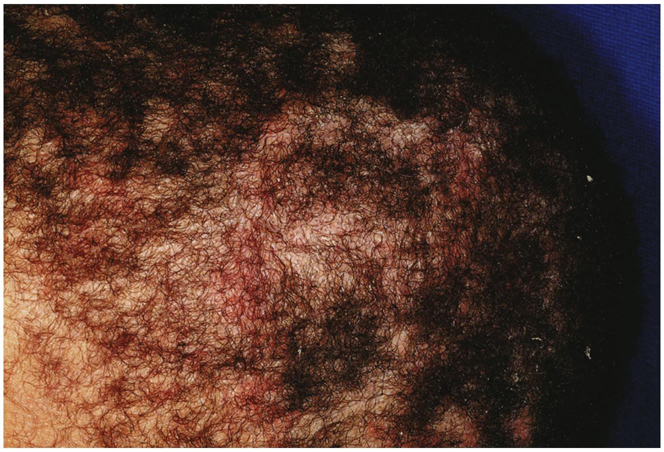

Fig. 9.9 Tinea capitis. (From Paller, A. S., & Mancini, A. J. [2022]. *Hurwitz clinical pediatric dermatology: A textbook of skin disorders of childhood and adolescence* [6th ed.].)

Red flags indicative of referral: Psoriasis

Reason for referral	Why referring	Timeframe for referral
• Lesions that cause moderate to severe itching	• Suggest other conditions such as fungal infection	• As soon as practicable
• Scaling lesions that do not show symmetry	• Suggests dermatitis, lichen planus or pityriasis rosea	
• Precipitation or aggravation of lesions while taking medicines	• Need to review or change medication	
• Extensive psoriasis	• Unlikely to respond to topical therapy	

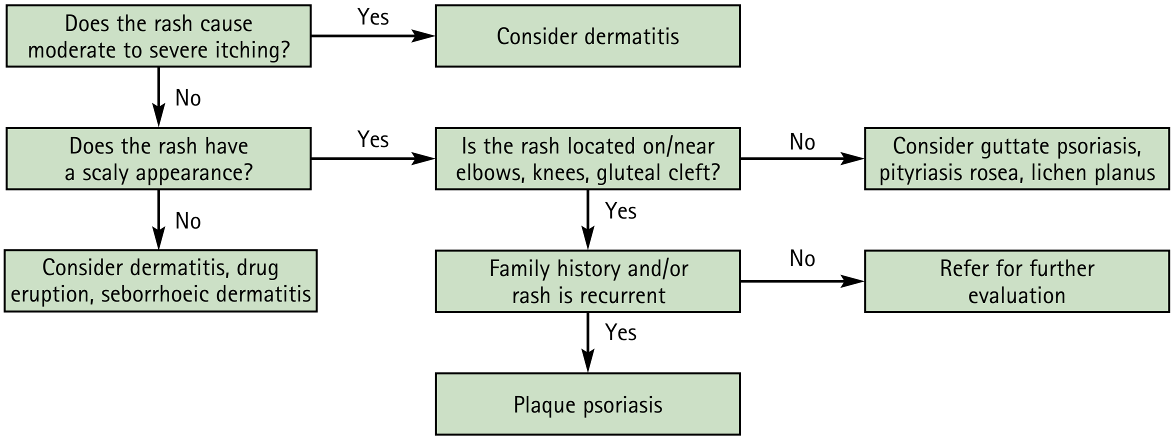
Does the rash cause moderate to severe itching?
Yes
Consider dermatitis
No
Does the rash have a scaly appearance?
Yes
Is the rash located on/near elbows, knees, gluteal cleft?
No
Consider guttate psoriasis, pityriasis rosea, lichen planus
No
Consider dermatitis, drug eruption, seborrhoeic dermatitis
Yes
Family history and/or rash is recurrent
No
Refer for further evaluation
Yes
Plaque psoriasis

Fig. 9.10 Primer for the differential diagnosis of plaque psoriasis.

HINTS AND TIPS BOX 9.1: PSORIASIS

Assessing the severity of psoriasis	• Two validated tools can be used to assess how psoriasis affects the patient: • DLQI (Dermatology Life Quality Index), a score that measures the impact of psoriasis on daily activities • PASI (Psoriasis Area and Severity Index), a score that measures the severity and extent of psoriasis
Length of treatment	• Topical treatments may have been used for several weeks before improvement in symptoms is seen.
Problems with tar and dithranol products	• Coal tar and dithranol share common problems of patient adherence. Both are messy to use, have a strong odour and can stain skin and clothing.
UV light	• 90% of patients see an improvement in their psoriasis when exposed to sunlight.
Emollient bath additives	• Some bath additives (e.g., Oilatum) make the bath slippery, and patients should be warned to be careful when getting out of the bath.

Evidence base for over-the-counter medication

Over-the-counter (OTC) remedies are effective in treating mild to moderate plaque and scalp psoriasis. However, before treatment is offered, it would be prudent to assess the impact the rash is having on the person. This can be done by using validated tools as described in the 'Hints and tips' in Box 9.1. Any treatment recommended should also be in conjunction with reassurance about its benign, noncontagious nature, but it should be emphasized that the condition is chronic and long term and has periods of remission and relapse. Signposting to additional information provided by charities such as the Psoriasis Association should be considered (see Websites). OTC treatment is limited to the use of emollients, keratolytics, coal tar or dithranol. Calcipotriol received a UK reclassification license from the Medicines and Healthcare products Regulatory Agency in August 2017, but the product has yet to be brought to market by the manufacturer. Prescribing of calcipotriol could be considered by independent prescribers.

Emollients

No published literature appears to have addressed emollient efficacy or whether one emollient is superior to another in treating patients with psoriasis. Subjective evidence over a long period of time has shown that emollients are useful and an important aspect of psoriasis treatment. Emollients are used to help soften scaling and soothe the skin to reduce irritation, cracking and dryness.

Keratolytics

Keratolytics, such as salicylic and lactic acid, have been incorporated into emollients to aid the clearance of skin scaling. Although there appears to be no published evidence for their efficacy, clinical practice suggests that they have a role to play in the removal of scale.

Coal tar

Coal tar remained the mainstay of treatment until the introduction of dithranol, corticosteroids and, more recently, vitamin A and D analogues. A number of clinical studies have confirmed the beneficial effect of coal tar on psoriasis, although a major drawback in assessing the effectiveness of coal tar preparations is the variability in their composition, making meaningful comparisons between studies difficult. Comparisons between coal tar and other treatment regimens have been conducted. Tham et al. (1994) compared the effectiveness of calcipotriol 50 μg twice daily versus 15% coal tar solution each day. Both treatments were shown to be effective, although calcipotriol was significantly better than the coal tar solution. Harrington (1999) compared two commercially available OTC products at that time, Psorin and Alphosyl. Findings showed that both helped in the treatment of psoriasis, but Psorin (which includes 0.11% dithranol) was significantly more effective. National Institute for Health and Care Excellence (NICE) guidance from 2017 endorses the use of coal tar, but it is generally used as a second- or third-line treatment.

Dithranol

A systematic review conducted by Mason et al. (2013) identified three placebo-controlled trials with dithranol, with all demonstrating a statistically significant improvement over placebo.

Practical prescribing and product selection

Emollients

All emollients should be regularly and liberally applied, with no upper limit on how often they can be used. All are chemically inert and can therefore be safely used from birth onwards by all patients. They do not have any interactions with other medicines. Patients might have to try several emollients before finding one that is most effective for their skin. For more information on emollients, see later in this chapter and the National Eczema Factsheet (http://www.eczema.org/emollients).

Tar-based products

All patient groups can safely use these products on the skin or scalp. They can cause local skin or scalp irritation and stain skin and clothes. There has been concern over topical tar products' association with an increased risk of skin cancer, although this appears to be unfounded (Roelofzen et al., 2010). Prescribing information relating to tar-based products is summarised in Table 9.6.

Table 9.6
Practical prescribing: Summary of tar-based products

Product	Scalp, skin, or both	Salicylic acid	Sulphur	Other ingredients	Children	Application
Alphosyl 2-in-1 Shampoo	Scalp	No	No	No	All ages	Once or twice weekly
Capasal	Scalp	Yes	No	Coconut oil 1%	All ages	Daily
Cocois	Scalp	Yes	Yes	No	Older than 6 years	Weekly
Exorex	Both	No	No	No	All ages	Two or three times a day
Polytar	Scalp	No	No	No	All ages	Once or twice weekly
Psoriderm	Both	No	No	No	All ages	Once or twice a day
SebCo	Scalp	Yes	Yes	No	Older than 6 years	Daily when needed
T/Gel	Scalp	No	No	No	All ages	Two or three times a week

Dithranol

Current practice dictates using dithranol once a day starting at the lowest possible concentration initially for at least 1 week and then increased to higher concentrations until improvement is noticed. Its place in practice is now generally limited to psoriasis affecting the limbs or trunk in which other treatments have been ineffective because of the high likelihood of skin irritation or burning. (Commercial products, e.g., Dithrocream, were discontinued as of autumn 2022.)

Useful tips relating to patients presenting with psoriasis are given in the ‘Hints and tips’ in Box 9.1.

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Psoriasis and Psoriatic Arthritis Alliance. http://www.paalliance.org/

Psoriasis Association. http://www.psoriasis-association.org.uk/

Dandruff (pityriasis capitis)

Background

Dandruff is a chronic, relapsing, noninflammatory hyperproliferative skin condition often seen as socially unsightly and a source of embarrassment.

Prevalence and epidemiology

Dandruff is very common and affects both sexes and all age groups, although it is unusual in prepubescent children. It has been estimated to affect 1% to 3% of the population (Gupta et al., 2004).

Aetiology

An increased cell turnover rate is responsible for dandruff, but why cell turnover increases is unknown. Increasingly, research has focused on the role of microorganisms on the pathogenesis of dandruff, particularly the yeast *Malassezia,* although the evidence is inconclusive as to whether *Malassezia* spp. is the primary cause of dandruff or a contributory factor. It has been shown that *Malassezia* spp. make up more of the scalp flora of people with dandruff, which might explain why dandruff improves in the summer months. (Fungal organisms thrive in warm and moist environments that exist on the scalp because of wearing hats and caps.) Further evidence to support a role of *Malassezia* spp. in the cause of dandruff is the positive effect of antifungal therapy on clearing dandruff.

Arriving at a differential diagnosis

Most patients diagnose and treat dandruff without seeking medical help. However, for patients who do ask for help and advice, it is important to differentiate dandruff from other scalp conditions (Table 9.7). Asking symptom-specific questions helps to establish a differential diagnosis (Table 9.8).

Table 9.7
Causes of scalp flaking and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	Dandruff
Unlikely	Contact dermatitis Scalp psoriasis Seborrhoeic dermatitis
Very unlikely	Tinea capitis

Table 9.8
Specific questions to ask the patient: Dandruff

Question	Relevance
Age	Dandruff and psoriasis can affect people of all ages. Tinea is most common in children.
Presence of erythema	Dandruff is not associated with scalp redness unless the person has been scratching. Redness is characteristic of psoriasis and tinea. Seborrhoeic dermatitis is limited to the scalp and tends not to cause redness.
Presence of other skin lesions	An adult with only scalp involvement is likely to have dandruff, especially in the absence of erythema. Many patients who have scalp psoriasis also have plaque psoriasis affecting the arms, legs and back.
Itch	Itch: Dandruff, tinea and psoriasis tend to cause itching but seborrhoeic dermatitis does not. Hair loss: Tinea should be considered.

Clinical features of dandruff

The scalp is dry, itchy and flaky. Flakes of dead skin are usually visible in the hair close to the scalp and are visible on the shoulders and collars of clothing.

Conditions to eliminate

Unlikely causes

Contact dermatitis
This is generally caused by direct irritation through application of something to the scalp, leading to scalp itching and scaling. Avoidance of the irritant should see an improvement in the condition. If no improvement is seen after avoiding the suspected irritant after 1 to 2 weeks, then reassessment of symptoms is needed.

Scalp psoriasis
Adults with scalp psoriasis can be confused with patients who present with severe and persistent dandruff. However, in psoriasis, slight redness of the scalp is observed, often extends beyond the hair margin and is commonly seen behind the ears.

Seborrhoeic dermatitis
Typically, seborrhoeic dermatitis affects areas other than the scalp. In adults, the trunk is commonly involved, as are the eyebrows, eyelashes and external ears. If only scalp involvement is present, yellowish scales tend to be present, and itch is absent or mild.

Very unlikely cause

Tinea capitis
Symptoms are characterized by scaling and itching of the scalp, broken hairs, and patches of alopecia. The scalp may show a black dot appearance caused by broken-off hair stubs and a degree of erythema.

Fig. 9.11 will aid the differentiation of dandruff from other scalp disorders.

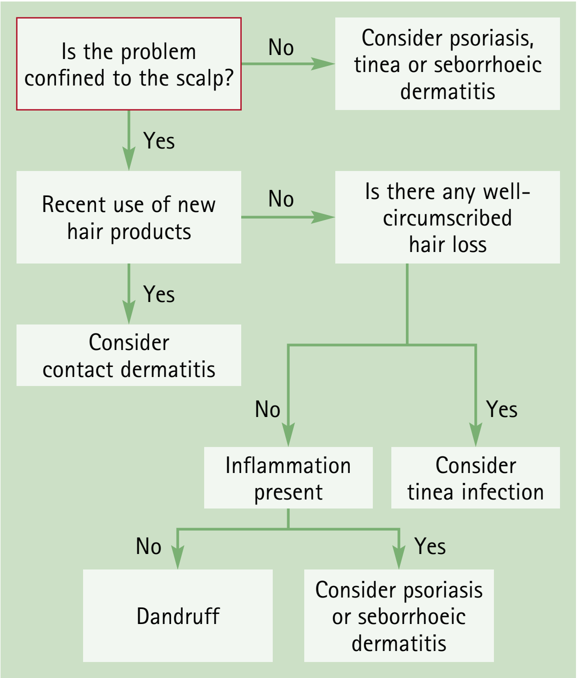
Is the problem confined to the scalp?
No
Consider psoriasis, tinea or seborrhoeic dermatitis
Yes
Recent use of new hair products
No
Is there any well-circumscribed hair loss
Yes
Consider contact dermatitis
No
Yes
Inflammation present
Consider tinea infection
No
Yes
Dandruff
Consider psoriasis or seborrhoeic dermatitis

Fig. 9.11 Primer for the differential diagnosis of dandruff.

Red flags indicative of referral: Dandruff

Reason for referral	Why referring	Timeframe for referral
OTC treatment failure	Suggests misdiagnosis	Not applicable; the patient could be reassessed by the pharmacist

Evidence base for over-the-counter medication

The use of a hypoallergenic shampoo daily usually controls mild symptoms. In more persistent and severe cases, a medicated shampoo can be used to control the symptoms. Treatment options include coal tar, selenium sulphide, zinc pyrithione and ketoconazole.

Coal tar

The mechanism of action for crude coal tar in the management of dandruff is unclear, although it appears that tars affect DNA synthesis and have an antimitotic effect. There are virtually no published studies to assess the efficacy of coal tars in the treatment of patients with dandruff. One study comparing coal tar with placebo (Manrìquez & Uribe, 2007), involving 111 people with seborrhoeic dermatitis or dandruff, found that coal tar reduced dandruff scores and redness compared with placebo at 29 days. Despite the lack of evidence, tar derivatives are found in a plethora of nonprescription medicated shampoos.

Selenium sulphide

Selenium is thought to work by its antifungal action. It is an effective antidandruff agent, and studies have shown it to be significantly better than placebo and nonmedicated shampoos (Manrìquez & Uribe, 2007; Rapaport, 1981).

Zinc pyrithione

Zinc pyrithione, like selenium, exhibits antifungal properties but also reduces cell turnover rates. It is believed that one or both properties contributes to its effectiveness. Few trials have been conducted with zinc pyrithione, although they have shown significant improvement in dandruff severity scores (Pierard-Franchimont et al., 2002).

Ketoconazole

Ketoconazole inhibits *Malassezia* replication by interfering with cell membrane formation. It helps in controlling the itching and flaking associated with dandruff. Studies have shown it to be an effective treatment (Danby et al., 1993; Peter et al., 1995). Ketoconazole has also been shown to act as a prophylactic agent in preventing relapse.

Practical prescribing and product selection

All antidandruff shampoos can cause local scalp irritation. If this is severe, the product should be discontinued. Any patient group can use them, although some manufacturers state that these products should be avoided during pregnancy. However, there appears to be no data to substantiate this precaution. Prescribing information is summarised in Table 9.9.

Coal tar products

Products containing coal tar are discussed under the section on practical prescribing for psoriasis.

Selenium sulphide (e.g., Selsun)

Adults and children older than the age of 5 years should use the product twice a week for the first 2 weeks and then once a week for the next 2 weeks. The hair should be thoroughly wet before applying the shampoo and left in contact with the scalp for 2 to 3 minutes before rinsing out. Selenium should be avoided if the patient has inflamed or broken skin because irritation can occur. It can discolour hair, but this can be minimized by thoroughly washing out the product. Additionally, gold, silver and other metallic jewellery should be removed before use because they can be discoloured.

Zinc pyrithione (e.g., Head & Shoulders)

Zinc-based products should be used daily until dandruff clears. Dermatitis has been reported with zinc pyrithione.

Table 9.9
Practical prescribing: Summary of medicines for dandruff

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Coal tar products	All ages	None	None	None	OK
Zinc pyrithione					
Ketoconazole	Older than 12 years				
Selenium	Older than 5 years				Manufacturers state to avoid in pregnancy and breastfeeding; however, there appears to be no evidence to preclude its use

Ketoconazole (Nizoral Dandruff and Nizoral Anti-Dandruff Shampoo)

This can be used to treat acute flare-ups of dandruff or as prophylaxis. To treat acute cases, the hair should be washed thoroughly, leaving the shampoo on for 3 to 5 minutes before rinsing it off. This should be repeated every 3 or 4 days (twice a week) for between 2 and 4 weeks. If used for prophylaxis, the shampoo should be used once every 1 to 2 weeks. Side effects are uncommon and mostly associated with local skin and eye irritation on application. It may rarely discolour hair.

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Seborrhoeic dermatitis

Background

There are two distinct types of seborrhoeic dermatitis, an infantile form (often referred to as 'cradle cap') and an adult form. It is a common condition, and lesions occur in areas rich in sebaceous glands (Fig. 9.12). It can present with varying degrees of severity, ranging from mild dandruff to a severe and explosive form in patients with acquired immunodeficiency syndrome (AIDS).

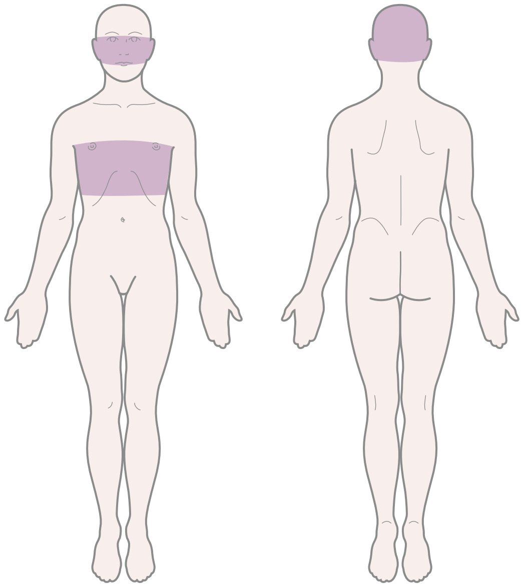

Fig. 9.12 Typical distribution of seborrhoeic dermatitis.

Prevalence and epidemiology

Estimates of the prevalence of seborrhoeic dermatitis range from 1% to 5% of the population. Cradle cap is usually self-limiting and starts in infancy (within the first 6 weeks) and before the age of 6 months. It is more prevalent than the adult form (Naldi & Rebora, 2009) and tends to be chronic and persistent. The adult form is more common in males and in people with an underlying neurologic illness (e.g., Parkinson disease).

Aetiology

Despite its name, there appears to be no changes in sebum secretion. Like psoriasis and dandruff, seborrhoeic dermatitis is characterized by an increased cell turnover rate. The precise cause of seborrhoeic dermatitis remains unknown; several theories have been put forward, ranging from immunologic, hormonal and nutritional mechanisms. Like dandruff, *Malassezia* spp. play an important role in the development of seborrhoeic dermatitis; however, it has not yet been established whether these organisms a primary or secondary role in clinical expression.

Arriving at a differential diagnosis

The infantile form is relatively easy to recognize, but the adult form is more problematic because the condition can affect various areas and present with different degrees of severity (Table 9.10). Asking symptom-specific questions helps to establish a differential diagnosis (Table 9.11).

Clinical features of seborrhoeic dermatitis affecting the scalp

Cradle cap appears as large, yellow, greasy scales and crusts on the scalp. This can become thick and cover the whole scalp (Fig. 9.13). Other areas can be involved, such as the face

Table 9.10
Causes of seborrhoeic dermatitis–like rash and the likelihood of presentation in community pharmacy

Incidence	Causes: Scalp	Causes: Face or body
Likely	Scalp psoriasis	Contact dermatitis
Unlikely	Dermatitis	Atopic dermatitis Psoriasis Rosacea
Very unlikely	Tinea capitis	Medicines Pityriasis rosea Pityriasis versicolor Systemic lupus erythematosus

(nasolabial folds), ears or flexural folds. Lesion involvement away from the scalp tends to be well defined, appearing dry and red with varying degrees of scaling. Itching is not usually present.

Clinical features of seborrhoeic dermatitis affecting the face and body

The adult form is characterized by a history of intermittent skin problems. The distribution of rash is typically symmetrical, affecting the central part of the face, scalp, eyebrows, eyelids, ears, nasolabial folds and midchest (Fig. 9.14). The rash is red, with greasy-looking scales, and is mildly itchy. Blepharitis and otitis externa are also common secondary complications.

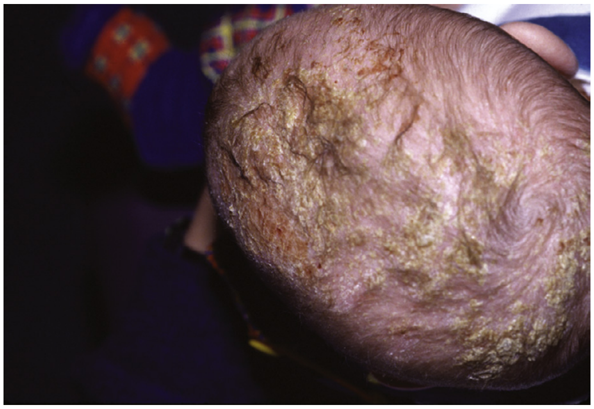

Fig. 9.13 Infantile seborrhoeic dermatitis. (From Kliegman, R., Behrman, R. E., Emerson Nelson, W., & Jenson, H. B. [2007]. *Nelson textbook of paediatrics.* Saunders Elsevier.)

Conditions to eliminate: Scalp

Likely

Scalp psoriasis

Adults with mild scalp psoriasis can be confused with patients who present with severe and persistent dandruff. However, in psoriasis, slight redness of the scalp is observed and often extends beyond the hair margin and is commonly seen behind the ears. Itch is common unlike seborrheic dermatitis.

Unlikely

Dermatitis

This is generally caused by direct irritation through application of something to the scalp, leading to scalp itching and scaling.

Table 9.11
Specific questions to ask the patient: Seborrhoeic dermatitis

Question	Relevance
Itching	In cradle cap, the rash does not itch. This is useful in differentiating cradle cap from atopic dermatitis because there is often overlap in the age when they present.
Location	The location of the adult form varies from other similar skin conditions such as psoriasis, which typically involves knees, elbows and sacral area.
Positive family history	Positive: Psoriasis and atopic dermatitis Negative: Tinea, seborrhoeic dermatitis
Look of lesions	Seborrhoeic dermatitis is associated with ‘greasy’, smooth lesions. Psoriasis and both forms of pityriasis show scaling. Rosacea exhibits papules.
Other symptoms	Ear and eyelid involvements are associated with seborrhoeic dermatitis. Mild itch is more associated with conditions such as pityriasis versicolor and psoriasis. Moderate or severe itch is associated with dermatitis and atopic dermatitis. The general health of a child with seborrhoeic dermatitis will be unaffected. A child who is fractious is more likely to have atopic dermatitis.
Physical signs	If you run your fingers through the hair of someone with seborrhoeic dermatitis, little is felt. In psoriasis, accumulation of scales gives the scalp an uneven, lumpy feel.

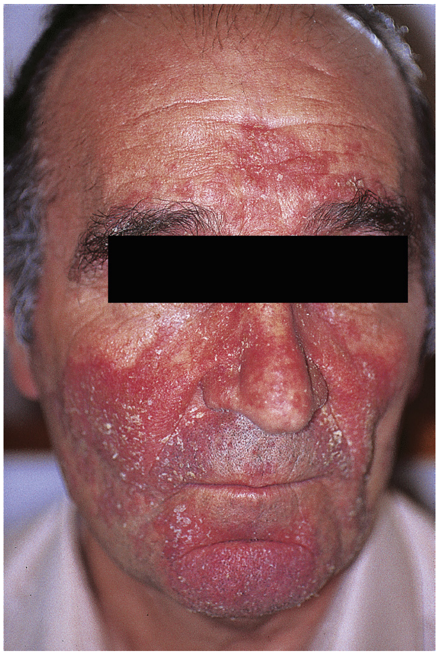

Fig. 9.14 Seborrhoeic dermatitis affecting the face. (From Gawkrodger, D. J. [2007]. *Dermatology: An illustrated colour text* [4th ed.]. Churchill Livingstone.)

Very unlikely

Tinea capitis

This is typically associated with erythema, itching and hair loss in children. However, it can present as a noninflammatory form in which scaling is prominent.

Conditions to eliminate: Face and body

Likely

Contact dermatitis

Dermatitis typically exhibits erythema, scaling and vesicles, especially in acute cases. However, in chronic forms, dryness, fissuring and scaling of the skin is observed that can mimic seborrhoeic dermatitis. Itch, however, is a prominent symptom in both acute and chronic forms.

Unlikely

Atopic dermatitis

The presentation differs depending on the age of the patient. However, itch is a common feature in all age groups. In infants, the cheeks and forehead are most affected; the flexures in children; and in adults, lesions can be more generalized, but the hands are often affected. A positive personal or family history of the atopic triad of dermatitis, asthma or hay fever is common. It is worth noting that in Asian and Afro-Caribbean children, the extensor surfaces rather than the flexures are often more affected.

Psoriasis

Although lesions show scaling, they tend to be characteristically salmon-pink in colour and occur on parts of the body (e.g., knees, elbows) that is not associated with seborrhoeic dermatitis.

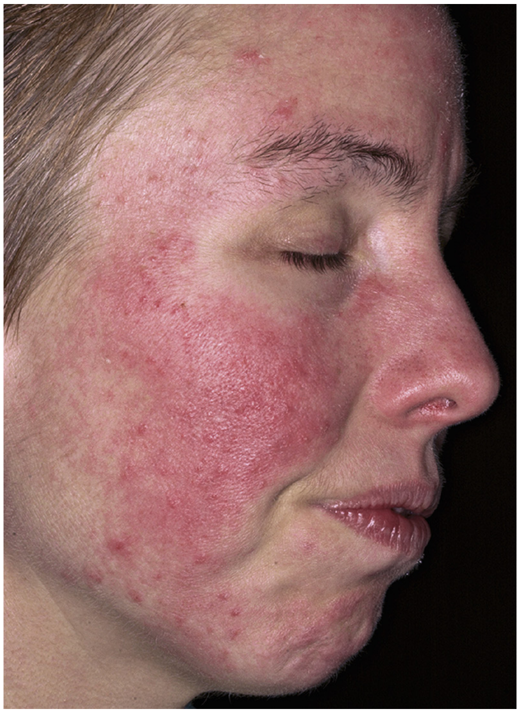

Fig. 9.15 Rosacea. (From [2021]. *Habif's clinical dermatology: A color guide to diagnosis and therapy* [7th ed.]. Elsevier.)

Rosacea

Rosacea predominately affects adults between 30 and 50 years of age, typically involving the central face, an area also affected in adult seborrhoeic dermatitis. However, in rosacea, there is obvious facial flushing, a mixture of papules and pustules, besides skin dryness and irritation (Fig. 9.15).

Very unlikely

Medicines

A number of medicines are associated with triggering or aggravating existing seborrhoeic dermatitis. These include buspirone, cimetidine, gold, griseofulvin, haloperidol, interferon alfa, lithium, methyldopa and phenothiazines.

Pityriasis rosea

This is characterized by multiple discrete circular or oval lesions that show erythematous scaling mainly on the trunk but also on the thighs and upper arms, and it exhibits symmetry (see Fig. 9.7). Unlike seborrhoeic dermatitis, a target disc lesion (herald patch) normally appears on the trunk a few days before the generalized rash. It most commonly affects young adults. Prodromal symptoms of fever and headache can be experienced before rash.

Pityriasis versicolor

Pityriasis versicolor (meaning 'branlike scaly rash of various colours') is a yeast infection (90% of cases are caused by to *Malassezia* spp.) and can be mistaken for adult seborrhoeic dermatitis. The lesions exhibit fine superficial scale and are located on the upper trunk. The

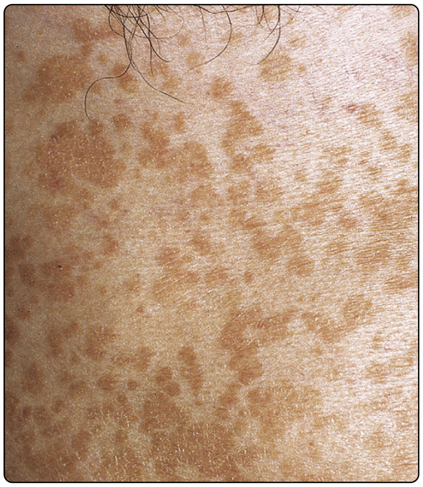

Fig. 9.16 Pityriasis versicolor. (From [2021]. *Dermatology: An illustrated colour text* [7th ed.].)

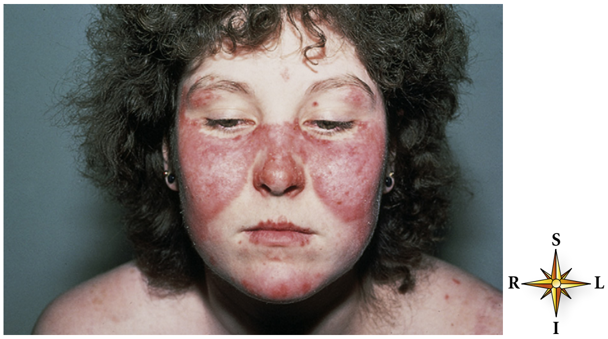

Fig. 9.17 Lupus erythematosus. (From [2024]. *The human body in health & disease* [8th ed.].)

macular lesions, which vary in colour, are usually small (<1 cm) but can join together to form larger patches (Fig. 9.16). The condition is associated more with warm climates, and most people acquire the infection when on holiday. The rash does not itch significantly. It is most often seen in young adults. It can be treated with antifungal lotions and shampoos or imidazole creams.

Systemic lupus erythematosus

Systemic lupus erythematosus (SLE) is an autoimmune disease that affects many body systems. Localized facial presentations exhibit a characteristic butterfly-shaped rash across the nose and cheek with fine scaling (Fig. 9.17).

Red flags indicative of referral: Seborrhoeic dermatitis

Reason for referral	Why referring	Timeframe for referral
• OTC treatment failure	• Suggests misdiagnosis	• As soon as practicable
• Hair loss	• Suggests tinea infection	
• Midfacial erythema in adults	• Suggests rosacea or SLE	

Evidence base for over-the-counter medication

For infants, simple measures, such as the daily use of a baby shampoo followed by gentle hair brushing, are usually only required. If this fails, the scales can be removed by applying an emollient followed by using a baby shampoo. If symptoms persist, a topical imidazole could be tried.

In adults, zinc pyrithione or selenium can be tried for mild cases of scalp involvement. However, ketoconazole should be used for resistant or more moderate disease (Okokon et al., 2015). For involvement on the face and torso, corticosteroids are effective, but OTC product licenses currently preclude their use.

Practical prescribing and product selection

Prescribing information relating to specific products used to treat seborrhoeic dermatitis is discussed under the discussion of dandruff in this chapter. In addition, at least one product (Dentinox Cradle Cap Shampoo) is marketed specifically for cradle cap. This contains sodium lauryl ether sulfosuccinate 6% and sodium lauryl ether sulphate 2.7%. The shampoo should be applied twice during each bath time until the scalp clears, after which it can be used when needed.

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Fungal skin infections

Background

Two main groups of fungi infect people, *Candida* yeasts and dermatophytes. However, in this section, only dermatophyte infections are discussed. Dermatophyte skin infections are classed by anatomic location, for example, athlete's foot (tinea pedis), groin infection (tinea cruris or *jock itch*), ringworm of the skin (tinea corporis) and scalp ringworm (tinea capitis).

Prevalence and epidemiology

Globally, dermatophytic fungi are more prevalent in tropical and subtropical areas because fungal organisms prefer high temperatures and high humidity. Having said this, dermatophyte infections (*Trichophyton* spp.) are commonly seen in more temperate Western countries. Tinea pedis (athlete's foot) is the most common fungal infection, although prevalence rates vary, depending on the population studied and whether the diagnosis is made by clinical symptoms or culture confirmation. Athlete's foot is said to affect about 15% of the UK population and is common among people of all ages. Tinea corporis mostly affects children and adolescents, and tinea cruris mostly affects adolescents and young adults.

Aetiology

Dermatophyte infections are contagious and transmitted directly from one host to another. They invade the stratum corneum of the skin, hair and nails but do not generally infiltrate living tissues. The fungus then begins to grow and proliferate in the nonliving cornified layer of keratinized tissue of the epidermis. Transmission of athlete's foot is thought to be commonly acquired from communal rooms (e.g., changing rooms), whereas infection of the groin can be acquired from contaminated towels and bed sheets or by auto-inoculation from an existing foot infection.

Arriving at a differential diagnosis

Tinea infections can affect all parts of the body, but the clinical presentation varies depending on the site involved (Fig. 9.18). Most forms of tinea infection, perhaps except for isolated lesions on the body, should be relatively easy to recognize but need to be differentiated from other conditions (Table 9.12). Asking symptom-specific questions helps to establish a differential diagnosis (Table 9.13). A visual inspection of the lesion should also be undertaken if possible.

Clinical features of tinea infections

Tinea pedis (Athlete's foot)

Athlete's foot is characterized by itching, flaking and fissuring of the skin, which can also appear white and soggy because of maceration of the skin (Fig. 9.19). The usual site of infection is in the toe webs, especially the fourth web space (web space next to the little toe). The feet often smell.

After being acquired, the infection can spread to other sites, including the sole and instep of the foot. Over time, this can infect the nails (see discussion of fungal nail infection later in this chapter). Cases of tinea infection in which the plantar surface has become involved may be persistent and difficult to treat.

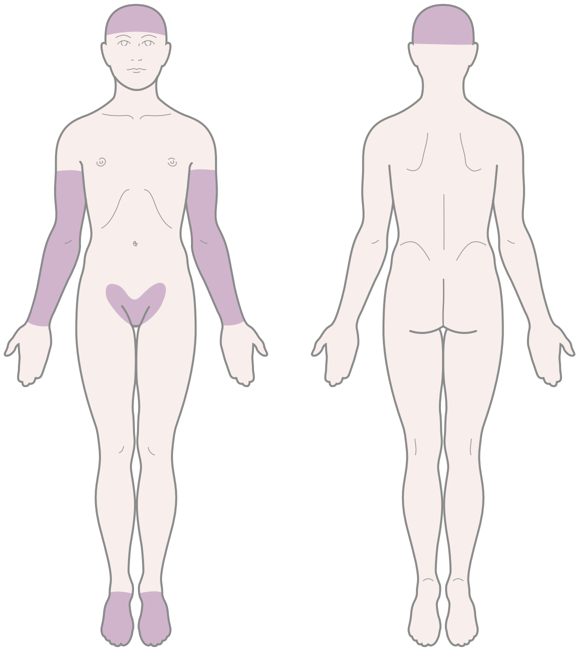

Fig. 9.18 Distribution of fungal infections.

Tinea corporis (ringworm)

Tinea corporis is defined as an infection of the major skin surfaces that do not involve the face, hands, feet, groin or scalp. Fungal infection of the body is usually seen in children and young adults. The usual clinical presentation is of asymmetrical itchy pink or red, scaly, slightly raised annular patches with a well-defined inflamed border, which enlarge outwards (Fig. 9.20). Over time, the lesions often show central clearing. Lesions range in size, typically 1 to 5 cm, and occur singly or can be numerous. Occasionally, they can coalesce to produce several overlapping circular lesions.

Tinea cruris (jock itch)

The rash is usually isolated to the groin and inner thighs but can spread to the buttocks. It is often bilateral and is normally intensely

Table 9.12
Causes of fungal-like conditions and the likelihood of presentation in community pharmacy

Incidence	Body	Groin	Feet
Likely	• Dermatitis • Psoriasis	• Intertrigo	
Unlikely	• Discoid eczema • Pityriasis rosea • Pityriasis versicolor	• Flexural psoriasis	• Bacterial infection • Dermatitis • Soft corn
Very unlikely	• Erythema multiforme • Cutaneous lupus erythematosus		• Psoriasis

Table 9.13
Specific questions to ask the patient: Fungal infections

Question	Relevance
Age and sex of patient	• Athlete's foot and jock itch are most prevalent in adolescents and young adults, especially in males. • Pityriasis infections common in young adults. • Cutaneous lupus erythematosus (CLE) is more common in females.
Presence of itch	• Mild or no itch is seen with psoriasis, intertrigo and pityriasis infections. • Moderate itch is associated with tinea infection and dermatitis. • Severe itch is seen in tinea cruris.
Lesions exhibiting scaling	• Fungal lesions tend to be dry and scaly (except athlete's foot) and have a sharp margin between infected and noninfected skin. • Scaling is seen with other conditions (e.g., dermatitis, psoriasis, pityriasis infections) but tends to be less prominent.
Central clearing	• Tinea corporis can show central clearing as the infection progresses over time. It is also seen in CLE. • Central clearing is not seen or is rare in forms of dermatitis or pityriasis infection.
Hand involvement	• Check for active athlete's foot infection because scratching of the feet transfers the infection to the hand.
Personal and family history	• Fungal infections are usually acute in onset with no previous episodes, although athlete's foot may become recurrent. • Psoriasis is associated with positive personal and family histories.

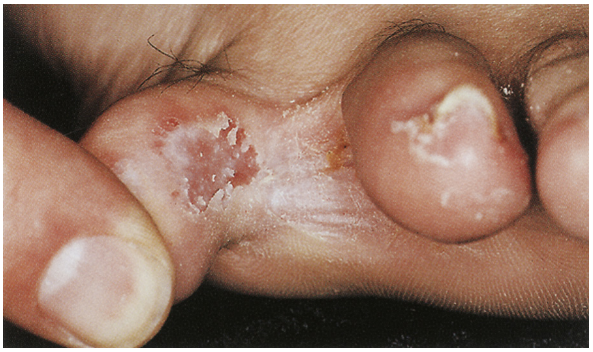

Fig. 9.19 Athlete's foot. (From Fleischer, A. B., Feldman, S., Clayton, E., & Katz, A. [2000]. *20 common problems.* McGraw-Hill.]

itchy and reddish brown, with a well-defined edge but does not tend to exhibit central clearing or scaling. It is commonest in adolescents and young males.

Tinea faciei

Fungal infections on the face are rare and are consequently often mistaken for other facial skin conditions. The lesions are similar in appearance to tinea corporis in that they normally have a sharp, well-defined border, show scaling and are itchy. Conditions such as acne, rosacea and lupus need to be considered in the differential diagnosis.

Tinea manuum

Tinea manuum is often misdiagnosed as eczema or psoriasis because of its atypical tinea appearance. The patient usually has chronic diffuse scaling of one palm. It is frequently caused by transfer of infection from a person who has athlete's foot.

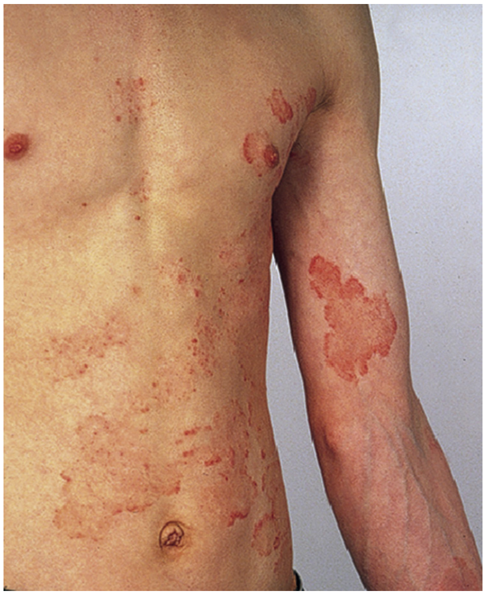

Fig. 9.20 Tinea corporis. (From Buttaravoli, P. [2007]. *Minor emergencies* [2nd ed.]. Mosby.)

Conditions to eliminate: Body

Likely

Dermatitis

Both fungal infections and dermatitis present as red itchy lesions and therefore can be difficult to distinguish from one another. Dermatitis does not generally show as much scaling, and central clearing is absent. Patients with dermatitis also often have a personal history of dermatitis or are able to describe an event that triggered the onset of the rash. Misdiagnosis of a fungal infection for dermatitis and subsequent treatment with a steroid-based cream will diminish the itch redness, and scaling, but the infecting organism will proliferate. On withdrawal of the steroid cream, the visible signs of the infection will return and be worse than before, often in a papular form (tinea incognito).

Psoriasis

Isolated fungal body lesions can be difficult to distinguish from plaque psoriasis. However, if the patient has psoriasis, there will normally be a personal or family history of psoriasis. Lesions tend to be less itchy, exhibit more silvery scaling and do not show central clearing.

Unlikely

Discoid eczema

This presents as round, raised, coin-shaped itchy lesions that particularly affect the arms and legs and often occur symmetrically. Lesions tend to have a less distinct leading edge and central clearing (Fig. 9.21).

Pityriasis rosea

This is characterized by multiple circular pink to fawn scaly lesions that tend to have less prominent leading edge and a lack of central clearing. Itch also tends to be less intense than fungal infection (see Fig. 9.7). A larger herald patch usually precedes the onset of the generalized rash and could be misdiagnosed as tinea corporis. Prodromal symptoms of fever and headache can be experienced before rash.

Pityriasis versicolor

Pityriasis versicolor presents with patchy, sharply demarcated macules of variable colour with fine scale. The rash tends not to itch and shows less inflammation than in tinea corporis (see Fig. 9.16).

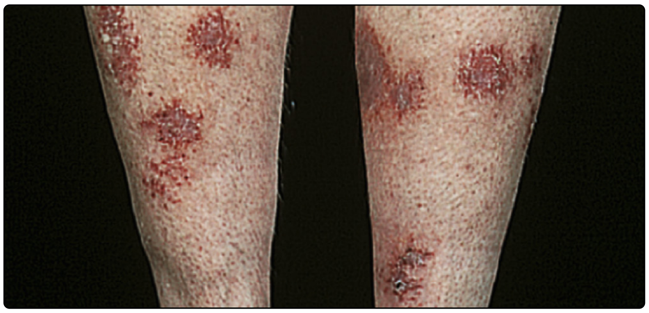

Fig. 9.21 Discoid eczema. (From Bryan, B. [2017]. Dermatology: An illustrated colour text, 6th ed. *Journal of the American Academy of Dermatology*, 76[6], e227.)

Very unlikely

Erythema multiforme

Typically precipitated by infection, it presents with symmetrical lesions of varying colour appearing as three concentric rings. Lesions begin on the peripheries before spreading centrally. Oral mucosal involvement is also common, presenting as shallow white ulcers. Symptoms are generally self-limiting, resolving in 4 to 6 weeks.

Cutaneous lupus erythematosus

This is an autoimmune condition associated with SLE and can present in a variety of forms, one of which, the subacute form, exhibits annular lesions that show central clearing typically on sun exposed areas. It is a rare condition and affects mostly females between the ages of 20 and 50 years.

Conditions to eliminate: Groin

Likely

Intertrigo

Intertrigo describes a rash in the flexures, for example, in the armpit or groin. It is a sign of inflammation and infection such as tinea but can be caused by other infections, such as *Candida* spp. In such cases, the skin will be inflamed and uncomfortable. The skin may peel and show superficial papules or pustules. Satellite lesions may also be present.

Unlikely

Flexural psoriasis

Presents atypically compared with plaque psoriasis with well-defined, red and glazed lesions that often itch.

Conditions to eliminate: Foot

Unlikely

Bacterial infection

Infections (usually gram negative) may occasionally cause interdigital redness and soreness. It would be expected that skin lesions away from the toes are present.

Dermatitis

Foot involvement is not uncommon. A contact reaction can occur and is most usually associated with an agent found in footwear. Redness and itch are common. However, interdigital involvement is unusual.

Soft corn

Soft corns (heloma molle) form between the toes rather and are caused by pressure exerted by one toe against another. They have a whitened appearance and remain soft because of moisture being present between the toes, causing maceration of the corn.

Very unlikely

Psoriasis

The palms and soles can be affected by psoriasis (localized palmoplantar pustular psoriasis). Lesions tend to be red, exhibit some scaling and have a sharp border with yellow-brown pustules present. Occasionally, it may superficially look like tinea pedis, but palmoplantar psoriasis often has other lesions present elsewhere and is chronic in nature, consequently, nail changes are often present.

Red flags indicative of referral: Tinea infections

Reason for referral	Why referring	Timeframe for referral
Symmetrically distributed annular rash with scaling but minimal central clearing	Suggests erythema multiforme, discoid eczema or psoriasis and the need for confirmation	For erythema multiforme, arrange an urgent referral For discoid eczema and psoriasis, as soon as practicable
Involvement of large areas of the trunk OTC treatment failure	Possible oral treatment needed	Urgent referral because prompt intervention is needed
Foot involvement other than interdigital space	Suggests one of the following: Spreading fungal infection that may require oral treatment Bacterial infection (need for antibiotics) Palmopustular psoriasis (need for dermatology referral)	

Evidence base for over-the-counter medication

Superficial dermatophyte infections can be treated effectively with topical OTC preparations. Six classes of medicines have marketing authorizations to be sold OTC. However, griseofulvin (formerly available as Grisol spray) was withdrawn in 2021.

Allylamines

Terbinafine inhibits the biosynthesis of ergosterol, an essential component of fungal cell membranes. Studies have shown terbinafine to have high cure rates, significantly better than placebo and slightly better than imidazoles (Crawford & Hollis, 2007).

Imidazoles

Imidazoles, like allylamines, act by inhibiting ergosterol production but at a later stage in the ergosterol biosynthesis pathway. They have largely replaced older agents (e.g., benzoic acid, undecenoates, tolnaftate) because they have greater efficacy and an excellent safety record (Crawford & Hollis, 2007). There appear to be no clinically significant differences in cure rates among the different imidazoles, and the treatment choice is driven by patient preference.

Benzoic acid

Benzoic acid acts by lowering intracellular pH of dermatophytes; it is combined with salicylic acid (Whitfield's ointment). Although Whitfield's ointment has been on the market for nearly a century, there is insufficient evidence to determine its efficacy (El-Gohary et al., 2014).

Undecenoates

The exact mechanism of action for undecenoates is not understood. They have been used to treat athlete's foot for over 30 years and are featured in the most recent *US Pharmacopoeia*. In a Cochrane review, undecanoic acid was said to be efficacious in treating fungal infections for skin and nail infections of the foot (Crawford & Hollis, 2007).

Tolnaftate

Tolnaftate is thought to work by distorting fungal hyphae. It appears to have the least amount of trial data supporting its use. The low patient numbers involved in the studies further compounds the difficulty in assessing its efficacy (Crawford & Hollis, 2007).

Summary

On current evidence, an imidazole or terbinafine would be first-line treatment. Both have similar mycologic and symptom cure rates, although terbinafine might be preferred because it clears symptoms in a shorter time, although it is more expensive.

Practical prescribing and product selection

Prescribing information relating to specific products used to treat fungal infections is summarised in Table 9.14; useful tips relating to patients presenting with fungal infections are given in the 'Hints and tips' in Box 9.2.

Imidazoles

All topical imidazoles have excellent safety records and can be used by all patient groups. Side effects experienced are irritation on application. To prevent reinfection, imidazoles should be used after the lesions have cleared, although the length of time varies from product to product. Full symptom resolution can take up to 1 month, depending on pathogen, location and severity of infection.

Clotrimazole (e.g., Canesten range)

Clotrimazole-containing products can be used for all dermatophyte and candidal infections. All Canesten products should be applied two or three times a day except for Canesten hydrocortisone, which can only be used twice a day. They are available in a range of formulations, including cream, spray and solution.

Table 9.14
Practical prescribing: Summary of medicines for tinea infections

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Imidazoles					
Bifonazole	All ages	Mild burning or itching	None	None	OK
Clotrimazole					
Miconazole					
Ketoconazole					
Imidazole–steroid combination	Older than 10 years				
Tolnaftate	No lower age stated	None			
Undecenoates					
Benzoic acid					
Terbinafine	Older than 16 years	Redness, itching			

HINTS AND TIPS BOX 9.2: FUNGAL INFECTION

Reinfection and transmission	General advice • Avoid scratching infected skin. • Keep a personal towel and do not share it to prevent the infection spreading from person to person. Athlete's foot • Dry the skin thoroughly after showering or having a bath. • Wear cotton socks and change them at least once a day. • Avoid the use of occlusive, nonbreathable shoes. • Dust shoes and socks with antifungal powder. • Use flip-flops (or equivalent) when using communal changing rooms.
Combination products containing a steroid or fungal agent	• The license states that the maximum period of treatment is 7 days. This limits their usefulness because many fungal infections take longer to clear than 7 days, especially because products need to be used after the lesions have cleared to prevent reinfection. Therefore, they are probably best used to control initial symptoms of redness and itch before switching to an imidazole-only product after the initial 7 days of treatment.

Bifonazole (Canesten Bifonazole Once Daily Cream)

Bifonazole is licensed for athlete's foot. For all patients, the cream should be applied once daily.

Ketoconazole (Daktarin Gold, Daktarin Intensiv)

Ketoconazole has a license for athlete's foot, groin infection and candidal intertrigo. For athlete's foot, the cream should be applied twice daily for 1 week. For groin infections and candidal intertrigo, the cream should be applied once or twice daily. For all conditions, treatment should be continued for 2 to 3 days after all signs of infection have disappeared to prevent relapse.

Miconazole (e.g., Daktarin, Daktarin Aktiv, Daktacort Hydrocortisone)

Products containing miconazole are suitable for all patients and should be applied twice a day. Treatment should continue for 10 days after all lesions have disappeared to prevent relapse. Daktacort hydrocortisone is suitable for children older than 10 years of age and is licensed for candidal intertrigo and athlete's foot.

Tolnaftate (e.g., Scholl Athlete's Foot range)

For athlete's foot and infections of the groin, tolnaftate should be used twice a day, with treatment continuing for at least 1 week after the infection has cleared up.

Undecenoates (e.g., Mycota)

For athlete's foot, it should be used twice a day, with treatment continued for at least 1 week after the infection has cleared up. Local irritation has been reported.

Benzoic acid (e.g., Whitfield's ointment)

This is now rarely used, but if recommended, it should be used twice daily.

Terbinafine (e.g., Lamisil range)

Terbinafine can be used to treat athlete's foot, groin infection and tinea corporis and is applied once daily. All products are licensed for those older than 16 years, except Lamisil Once, which is for use in people older than 18 years.

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Further reading

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Fungal nail infection (onychomycosis)

Background

The deregulation of amorolfine in the United Kingdom and other Western countries (e.g., Australia) now makes it possible for community pharmacists to treat patients with infection affecting the toenails. Onychomycosis is defined as a chronic fungal infection of the fingernails or toenails, although only infection of the toenail is covered here. If left untreated, it can lead to pain and discomfort, which can make wearing shoes difficult. The nails, over time, will disfigure and crumble away.

Prevalence and epidemiology

It is estimated that 5% to 10% of the general population has onychomycosis (Thomas et al., 2010). The incidence of infection increases with increasing age and is particularly common in males older than 70 years (estimated to affect 50% of people).

Aetiology

More than 90% of cases are caused by dermatophytes (*Trichophyton rubrum* and *Trichophyton interdigitale*), with the remainder caused by yeasts and moulds. In most cases, predisposing factors can be determined in the development of nail infection, for example, an initial skin infection (tinea pedis), psoriasis, in immunocompromised patients or poor peripheral circulation and neuropathies (e.g., diabetes).

Arriving at a differential diagnosis

Different types of fungal nail infection can be encountered, but amorolfine is only licensed for the treatment of distal lateral subungual onychomycosis and therefore needs to be differentiated from other causes (Table 9.15). Asking symptom-specific questions and inspecting the feet help to establish a differential diagnosis (Table 9.16).

Table 9.15
Causes of nail discolouration or deformity and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Distal lateral subungual onychomycosis
Likely	• Psoriasis • Trauma
Unlikely	• Eczema • Superficial white onychomycosis
Very unlikely	• Lichen planus • Proximal subungual onychomycosis

Table 9.16
Specific questions to ask the patient: Nail discolouration or deformity

Question	Relevance
Location	Base of nail suggests PCO End of nail suggests DLSO Randomly over nail suggests superficial white onychomycosis
Colour	Yellow suggests DLSO or psoriasis White suggests PCO or superficial white onychomycosis
Presence of rash	Suggests psoriasis, lichen planus or dermatitis
Deformity of nail	Suggests trauma, psoriasis, or lichen planus

DLSO, Distal lateral subungual onychomycosis; *PCO,* proximal subungual onychomycosis.

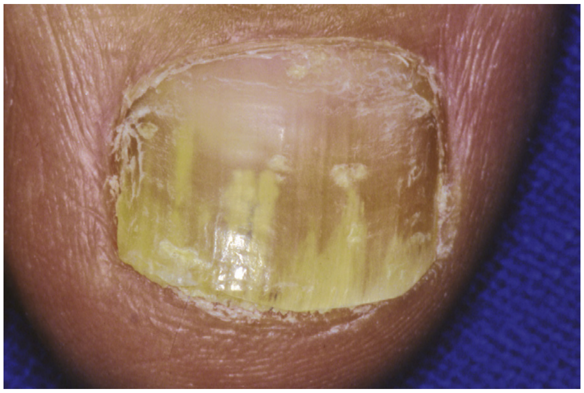

Fig. 9.22 Tinea unguium. (From Buttaravoli, P. [2007]. *Minor emergencies* [2nd ed.]. Elsevier Mosby. [2020]. *McKee's pathology of the skin: With clinical correlations* [5th ed.].)

Clinical features of distal lateral subungual onychomycosis

Distal lateral subungual onychomycosis is usually asymptomatic, but people seek medical help because of concerns about the appearance of the nail, which takes on a dull yellow appearance at the distal part of the toe. The big toe is most commonly affected, but it can affect other toenails. Over time, the nail thickens and distorts, and as infection spreads and worsens, the nail becomes brittle and crumbles away or falls off (Fig. 9.22).

Conditions to eliminate

Other fungal infections

Proximal subungual onychomycosis

This is a rare form of fungal infection characterized by white or yellow spots appearing at the proximal growing end of the nail. (i.e., in the half-moon area of the nail) (Fig. 9.23). Unlike other nail infections, concurrent tinea pedis is rare. It is more common in immunocompromised patients.

Superficial white onychomycosis

This infection appears as speckled lesions randomly distributed over the surface of the nail plate, which gradually coalesces to appear as flaky chalky-white patches that become crumbly (Fig. 9.24). It is most common in children.

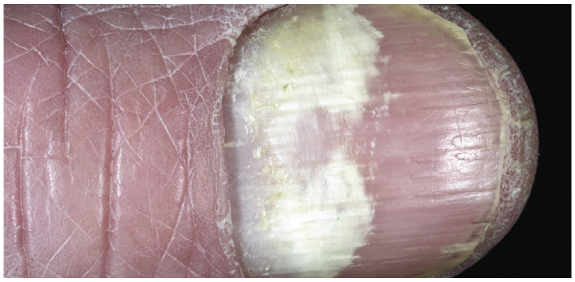

Fig. 9.23 Proximal subungual onychomycosis. (From Habif, T. P., Dinulos, J. G. H., Chapman, M. S., Werchniak, A. E., & Barton, D. T. [2020]. *Dermatology DDX deck* [3rd ed.]. Elsevier.)

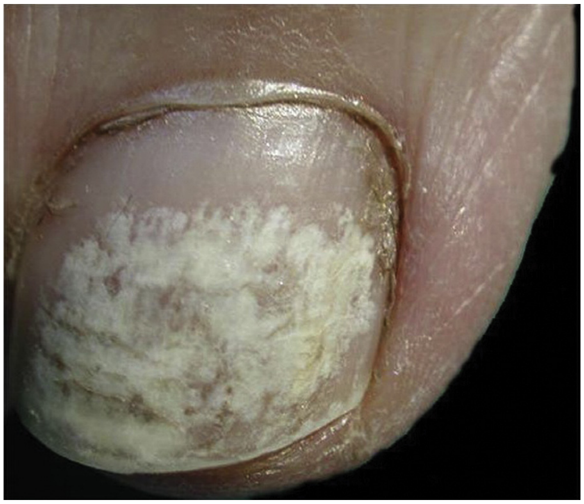

Fig. 9.24 Superficial white onychomycosis. (CID, 2010.)

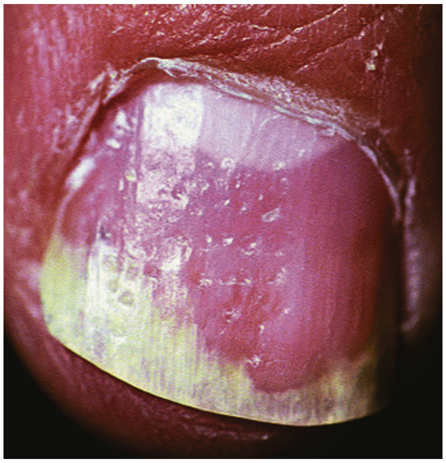

Fig. 9.25 Nail pitting seen in psoriasis.

Likely causes

Psoriasis

Nail involvement affects up to 50% of people with psoriasis and tends to be present in people with long-standing psoriasis. Nail pitting is generally present (Fig. 9.25). The nail bed can also be discoloured.

Trauma

Trauma of the nail plate can lead to the nail looking abnormal. There should be an identifiable event that affected the nail.

Unlikely cause

Eczema

In eczema, the nail may appear irregular or exhibit ridges, but there should be signs of lesions away from the nails.

Very unlikely cause

Lichen planus

Nail involvement is possible but rare. If nails are affected, then the nails will be abnormal, exhibiting grooves, ridges or fissures. The nail may also be discoloured.

Red flags indicative of referral: Distal lateral subungual onychomycosis

Reason for referral	Why referring	Timeframe for referral
Fungal infection other than DLSO	OTC products are not licensed for their treatment. Oral terbinafine probably needed.	As soon as practicable
OTC treatment failure	Suggests misdiagnosis or the need for oral terbinafine treatment	

Evidence base for over-the-counter medication

Amorolfine is a broad-spectrum antifungal agent that works by inhibiting ergosterol synthesis. An open-label, nonrandomized trial has shown it to be effective, producing clinical cure in 37% of toenail infections (Zaug & Bergstraesser, 1992). However, the study had large dropout rates (nearly 30%), and there were no comparisons with other available topical antifungal treatments. A further trial comparing once- versus twice-weekly application of amorolfine reported similar cure rates (46%) with weekly application (Reinel, 1992). A Cochrane review found limited evidence for the efficacy of any topical treatments for nail infections but suggested that cure rates may be better with amorolfine, although this was based on small trials (Crawford & Hollis, 2007).

Practical prescribing and product selection

Prescribing information relating to amorolfine is summarised next; useful tips relating to patients presenting with fungal nail infection are given in the 'Hints and tips' in Box 9.3.

Amorolfine (e.g., Curanail, Care, Schollmed once-weekly fungal nail treatment)

Amorolfine is available as a 5% nail lacquer. It is used weekly, and treatment continues until the affected nail(s) have regrown and are clear of infection. This takes approximately 9 to 12 months. Each pack provides treatment for 3 months, which affords the pharmacist an opportunity to review treatment before further medication is given. The product licenses restrict use to no more than two nails in people older than 18 years and who have no underlying medical conditions that predispose them to fungal infection (e.g., immunocompromised individuals, people with diabetes). To apply amorolfine, the nail must first be filed and cleaned. Files and cleaning pads are provided in treatment packs. The lacquer should then be evenly applied and left to dry. Amorolfine is unlikely to cause side effects, but skin irritation has been reported. Manufacturers recommend it should not be used in pregnant or breastfeeding females because of a lack of safety data.

Note that there are other products marketed for nail infections (e.g., Scholl fungal nail treatment), but they have no evidence of efficacy and should not be recommended.

HINTS AND TIPS BOX 9.3: FUNGAL NAIL INFECTIONS

Why limit OTC treatment to two nails?	This is in line with UK guidance, which indicates systemic treatment (e.g., terbinafine) for widespread infections.
Hygiene measures	Keep the area clean. Change socks regularly. Keep nails trimmed short and filed down. Avoid trauma to the nails. Avoid sharing towels.

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Website

For more images of fungal nail infection visit. https://www.dermnetnz.org/topics/fungal-nail-infections.

Hair loss

Background

Each hair consists of a shaft made up of dead keratinized cells and a root (see Fig. 9.1) and is found on most skin surfaces (palms of hands, soles of feet and lips being notable exceptions). Hair loss affects both males and females and is associated with strong emotional and psychological consequences. Hair loss can have a number of causes; however, this section concentrates on androgenetic alopecia because it is the most common cause of hair loss.

Prevalence and epidemiology

Males are more susceptible than females and usually experience more severe hair loss. Males tend to be affected from the second decade onwards (30% of males by 30 years old will be affected to some degree), and the prevalence of male pattern baldness in Whites who reach old age approaches 100%. Asian and black males are less prone to hair loss. It can affect up to 50% of females with the incidence increasing after menopause. Patients usually have a positive family history. The nature and extent of hair loss follow identical patterns to those seen in the patient's immediate parents and grandparents, which can be used as a predictor to the patient's potential hair loss pattern.

Aetiology

Most causes of hair loss are associated with the hair growth cycle, which consists of three stages: anagen, catagen and telogen. In the anagen stage, the cells in the hair bulb divide rapidly, creating new hair growth. The catagen stage is a transitional short phase, during which hair stops growing and detaches itself from the blood supply and is termed a 'club hair'. The final stage, the telogen stage, begins with a resting period, during which club hairs rest in the root while new hair begins to grow beneath it. After this time, the resting club hairs fall out to allow a new hair to grow. Hair loss is therefore caused by a decrease in hair growth (anagen hair loss), an increase in hair shedding (telogen hair loss) and conversion of thick terminal hairs to thin vellus hairs. In androgenetic alopecia, terminal hair follicles transform into more vellus-like hair follicles because of preferential binding by dihydrotestosterone (produced from the conversion of androgen by 5α-reductase) to hair follicle receptors. Eventually, the follicle ceases activity completely, with resulting hair loss.

Arriving at a differential diagnosis

Hair loss is obviously easy to notice. Empathy and understanding towards the patient need to be shown. Although androgenetic alopecia is the most common form of hair loss, other causes need to be eliminated (Table 9.17). Asking symptom-specific questions helps to establish a differential diagnosis (Table 9.18).

Table 9.17
Causes of hair loss and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Androgenetic alopecia
Likely	• Medicines • Postpartum • Stress
Unlikely	• Alopecia areata • Iron deficiency • Thyroid dysfunction

Very unlikely	• Inflammatory skin diseases
	  • Lichen planopilaris
	  • Folliculitis decalvans
	• Lupus erythematosus
	• Secondary syphilis
	• Tinea capitis
	• Trichotillomania
	• Traction alopecia

Table 9.18
Specific questions to ask the patient: Hair loss

Question	Relevance
Hair loss accompanied by other symptoms	• Androgenetic alopecia is not associated with other symptoms. • Itch and erythema are indicators of another cause (e.g., infection). • Systemic symptoms are associated with infection. • Fatigue may indicate anaemia, lupus or thyroid dysfunction.
Pattern of hair loss	• Androgenetic alopecia in males shows hair loss that begins at the front of the head and recedes backwards or at the crown. In females, hair loss tends to be generalized and diffuse. • Patchy hair loss is associated with alopecia areata, lichen planopilaris, tinea infection and trichotillomania.
Sudden hair loss	• It is not associated with alopecia androgenetica. • It is associated with alopecia areata, infection or a traumatic event.
Hair loss triggers	• Hair loss can be caused by a stressful event or after surgery or childbirth.
Itching scalp	• It is associated with unusual causes of hair loss.

Clinical features of androgenetic alopecia

Androgenetic alopecia describes a distinctive pattern of hair loss that may occur in genetically predisposed people. Males initially notice a thinning of the hair and a bitemporal receding hairline that might or might not be accompanied by hair loss at the crown. In females, the frontal hairline is maintained with diffuse hair loss that is somewhat accentuated at the crown. A widening of the central parting can also be seen.

Conditions to eliminate

Likely causes

Medicine-induced causes

Many medicines can interfere with the hair cycle and cause transient hair loss, with cytotoxic medicines being one of the most obvious examples. Table 9.19 lists some of the more commonly implicated medicines. If medicines other than cytotoxics are suspected of causing hair loss, the prescriber should be contacted to discuss other possible treatment options.

Table 9.19
Medicines known to cause hair loss

Medicine or medicine class	Incidence of hair loss
Antineoplastics	Almost 100%
Anticoagulants	~50% of patients
Lithium carbonate	~10% of patients
Interferons	20–30% of patients
Oral contraceptives	Seen 2–3 months after stopping
Retinoids	~20% of patients
Beta-blockers, colchicine, carbimazole, proton pump inhibitors	Rare

Postpartum

During pregnancy, circulating levels of oestrogen increase, with a resulting increase in the number of follicles in anagen (growth phase); the hair therefore thickens. However, after delivery, the hair follicles return to the resting phase, and the hair is shed. Females might believe that they are experiencing hair loss when in reality the hair is returning to the normal prepregnancy state. Reassurance should be given that this is a temporary and self-limiting problem.

Stress

Stress is known to induce hair loss. The reason behind this is poorly understood. Enquiry to ascertain lifestyle factors that might have caused recent stress and anxiety to the patient should be explored.

Unlikely causes

Alopecia areata

This refers to hair loss of unknown origin, although there is often an association with atopy and autoimmune disease, and a positive family history is found in up to 25% of patients. It is relatively uncommon, affecting 0.1% to 0.2% of the UK population. Unlike androgenetic alopecia, hair loss mainly affects children and adolescents (60% have had their first episode before the age of 20 years). It is characterized by sudden onset nonscarring hair loss which ranges from a single oval patch to multiple patches that can become confluent. It often results in unpredictable hair loss. In most cases, hair falls out in a few small patches, but occasionally, it can present with diffuse widespread thinning and shedding (alopecia totalis). The classic finding is a smooth, hairless patch surrounded by so-called exclamation point hairs (short broken hairs which taper proximally) that may be seen around the margin or in any part of the patch). The hair may regrow partially or completely in 80% of initial episodes.

Iron deficiency

Iron deficiency is associated with female hair loss. Other symptoms of anaemia should be present and include dyspnoea, fatigue, headache and pallor. If iron deficiency is the cause, a 2-month course of iron supplementation should result in a thickening of the hair. If the patient fails to respond to treatment, the patient should be reassessed.

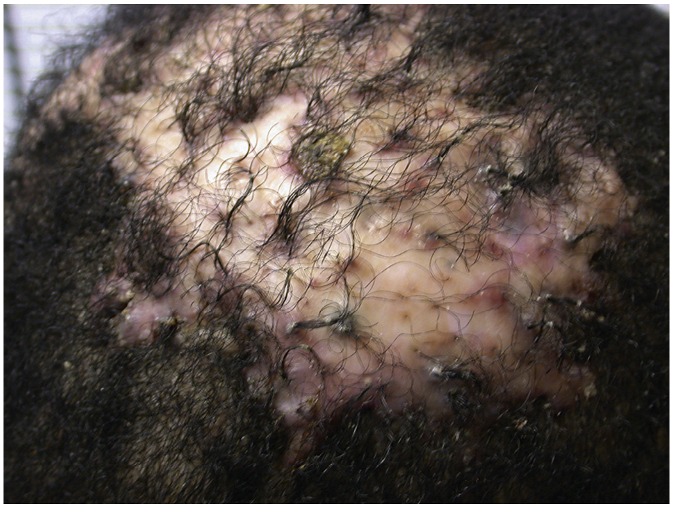

Fig. 9.26 Folliculitis decalvans. (From [2023]. *Andrews' diseases of the skin clinical atlas* [2nd ed.].)

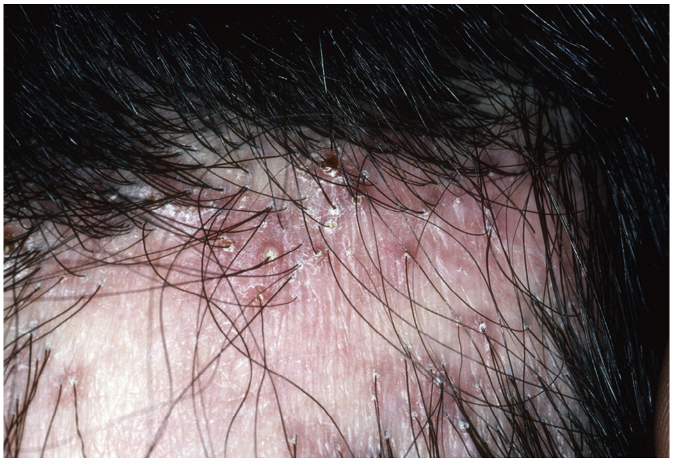

Fig. 9.27 Lichen planopilaris. (From [2018]. *Andrews' diseases of the skin clinical atlas*.)

Thyroid dysfunction

Hypothyroidism can result in poor hair growth, hair that is thin and brittle and ultimately hair loss. Other symptoms are prominent and include fatigue, cold intolerance, weight gain, impaired concentration and dry skin.

Very unlikely causes

Inflammatory skin diseases

Folliculitis decalvans

Folliculitis decalvans is a rare cause of hair loss often around the crown. It usually affects middle-aged males. Besides hair loss, it may also cause mild itch, discomfort or pain. It is also known as tufted folliculitis because of the 'toothbrush' appearance in long-standing cases, in which multiple hair shafts emerge from a single hair follicle (Fig. 9.26).

Lichen planopilaris

Lichen planopilaris is also rare. It usually affects young adult females and typically presents as smooth white multiple patches of hair loss that can merge to form large irregular patches (Fig. 9.27). Itch, discomfort and pain may also be present.

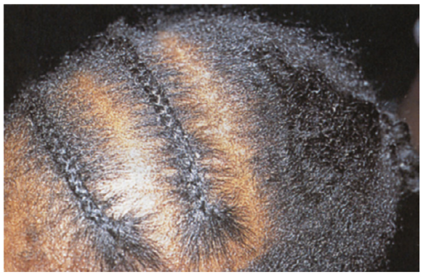

Fig. 9.28 Traction alopecia. (From Cohen, B. A. [2013]. *Atlas of Pediatric Dermatology*. [4th ed]. China: Elsevier Limited, 220.)

Lupus erythematosus

This presents with a wide range of symptoms that vary from person to person. Symptoms often flare up and remit. The most common symptoms are extreme fatigue, fever, joint pain and skin lesions (often a butterfly-shaped rash on the face that covers the cheeks and bridge of the nose). It can also cause hair loss. Hair loss may be an early sign of lupus; there are two forms of alopecia—a scarring form that causes permanent hair loss and a nonscarring form that tends to show gradually hair thinning, especially on the hair line and is not permanent.

Secondary syphilis

Secondary syphilis presents with systemic and cutaneous symptoms that over time resolve spontaneously. Patchy hair loss is one manifestation of cutaneous symptoms.

Tinea capitis

The first sign of infection is the appearance of a well-circumscribed round patch of alopecia that is associated with itch and scaling. Common areas of involvement include the occipital, parietal and crown regions. Inspection of the area might reveal erythema and black dots on the scalp because of broken-off hair stubs (see Fig. 9.9). Children are most likely to be affected.

Traction alopecia

This is a form of unintentional hair loss associated with specific social, cultural and cosmetic practices, most seen in females. It refers to excess and sustained tension on the hair, usually as a result of styling hair with rollers or a particular type of hairstyle. Hair loss usually occurs in the frontotemporal area (Fig. 9.28). It is reversible if the tension on the hair is removed.

Trichotillomania

Trichotillomania is a psychiatric disorder that refers to patients who have an impulsive desire to twist and pull their scalp hair but often deny it. Hair loss is asymmetrical and an unusual shape. Patients present with uneven broken hairs in the most frequently pulled areas. It is more commonly seen in females.

Fig. 9.29 provides a primer for the differential diagnosis of hair loss.

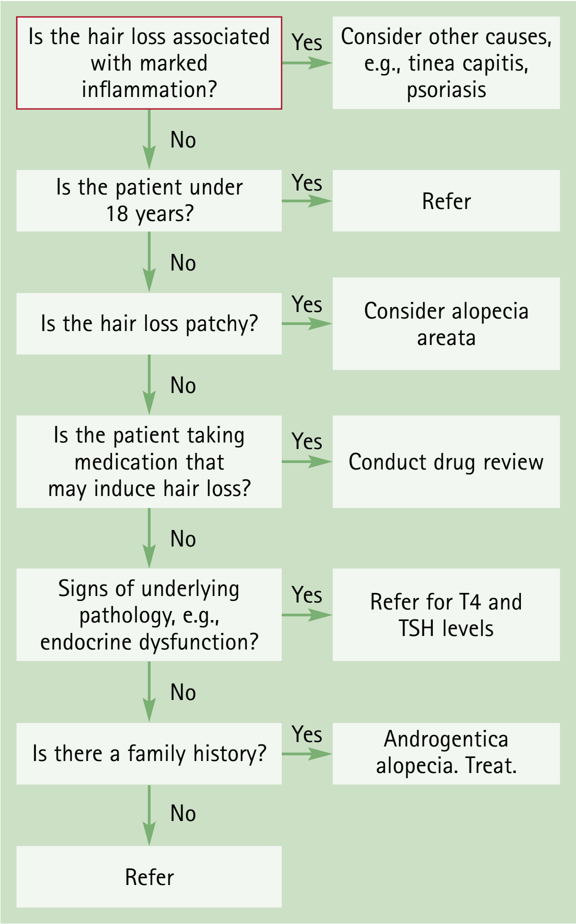
Is the hair loss associated with marked inflammation?
Yes
Consider other causes, e.g., tinea capitis, psoriasis
No
Is the patient under 18 years?
Yes
Refer
No
Is the hair loss patchy?
Yes
Consider alopecia areata
No
Is the patient taking medication that may induce hair loss?
Yes
Conduct drug review
No
Signs of underlying pathology, e.g., endocrine dysfunction?
Yes
Refer for T4 and TSH levels
No
Is there a family history?
Yes
Androgentica alopecia. Treat.
No
Refer

Fig. 9.29 Primer for the differential diagnosis of hair loss. *T_4*, Thyroxine; *TSH,* thyroid-stimulating hormone.

Red flags indicative of referral: Hair loss

Reason for referral	Why referring	Timeframe for referral
• Children or young people	• Suggests alopecia areata or tinea infection	• As soon as practicable
• Sudden onset	• Suggests alopecia areata	
• Asymmetrical or patchy hair loss	• Suggests alopecia areata, lichen planopilaris or trichotillomania	
• Systemic symptoms	• Suggests infection or lupus	
• Fatigue	• Suggests iron deficiency or thyroid dysfunction	
• Itching scalp	• Suggests folliculitis decalvans, tinea infection or lichen planopilaris	

Evidence base for over-the-counter medication

Currently, minoxidil is the only product marketed for androgenetic alopecia. It is available in 2% and 5% concentrations. A number of clinical trials have investigated the efficacy and safety of minoxidil at both concentrations. Most of these have been conducted on precisely the population that would respond the best to treatment: males between 18 and 50 years of age, with mild to moderate thinning of the hair at the vertex. Despite this, trial results are not totally convincing. Minoxidil is superior to placebo (although placebo does promote a large initial response), promotes a small increase in regrowth of vellus hair and increases the diameter of the hair shaft. In a randomized 48-week trial of 2% and 5% minoxidil, both preparations produced a statistically significant increase in hair count and investigator-rated benefit from treatment (Olsen et al., 2002). However, the average investigator-rated benefits from treatment using a scale of 0 to 100 (with 0 no benefit 50 moderate benefit and 100 great benefit) were only 33.7 for the 5% solution, 30.2 for the 2% solution and 12.6 for placebo. In another randomized controlled trial, minoxidil increased hair growth moderately after 16 weeks in 7.9% of males using the product compared with 0.6% in those on placebo (Olsen et al., 2007). However, longitudinal studies show that fewer than half of patients treated experience moderate to marked hair growth. Hair counts appear to be greatest after 12 months of treatment, but by 30 months, hair counts have decreased (albeit still above baseline), and the bald area increases back in size to its initial diameter (Koperski et al., 1997).

Minoxidil therefore appears to delay and slow down hair loss in less than half of its target patient population. Furthermore, if treatment is stopped, any hair growth achieved is lost within 6 to 12 months on discontinuation of therapy, and baldness returns to pretreatment levels.

The situation in females is not too dissimilar, although the 5% solution offers no advantage over the 2% solution. A 2015 meta-analysis by Gupta and Charrette confirmed these findings, concluding that despite significant clinical efficacy, cosmetically acceptable results are present in only a subset of patients.

Summary

Minoxidil will not significantly help most balding individuals. It promotes moderate or marked hair growth in approximately one-third of minimally balding young males. Oral finasteride (1 mg/day) can be used to treat androgenic alopecia in males, but currently there is no good-quality evidence that it is superior to minoxidil.

Practical prescribing and product selection

Minoxidil (e.g., Regaine range)

The dosage for minoxidil is 1 mL of solution (or 1 g of foam, equivalent to half a capful) applied to dry hair on the total affected areas of the scalp twice daily. If fingertips are used to facilitate drug application, the hands should be washed afterwards because absorption into the systemic circulation can occur. This may lead to cardiovascular problems such as chest pain (common) and, uncommonly, rapid heartbeat, faintness or dizziness. Other common but less important adverse effects are headache and local irritation, redness and itching; skin reactions appear to be related to the vehicle, propylene glycol, rather than minoxidil. Changes in blood pressure should not occur because the serum level of minoxidil after topical application is below the amount needed to cause changes to blood pressure; however, as a precaution, minoxidil should be avoided in patients with hypertension if possible. Some patients also report a temporary increase in hair shedding 2 to 6 weeks after beginning treatment. This subsides and is most likely due to the action of minoxidil, shifting hairs from the resting telogen phase to the growing anagen phase. It has no significant interactions. It cannot be used in pregnancy and breastfeeding. Some patients may experience changes in hair colour or texture with minoxidil use

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Website

Alopecia UK. https://www.alopecia.org.uk/

Warts and verrucas

Background

Warts and verrucas are benign growths of the skin caused by the human papillomavirus (HPV). Certain types of HPV have an affinity for certain body locations, for example, the hands, face, anogenital region and feet. HPV infections involving the anogenital area are outside the remit of community pharmacists and must be referred.

Spontaneous resolution is seen in 30% of people within 6 months and two-thirds of cases within 2 years. Despite their self-limiting nature, they are cosmetically unacceptable to many patients, with nearly 60% of people trying an OTC treatment before visiting a doctor.

Prevalence and epidemiology

The prevalence of warts has not been accurately documented, and published prevalence data vary widely. Children are most affected, with 2% to 20% experiencing symptoms before the age of 16 years. Warts are uncommon in infants and in older adults, and caution should be exercised if an older patient presents to the pharmacy with a self-diagnosed wart.

Aetiology

HPV gains entry to the host by epithelial defects in the epidermis. It is transmitted by direct skin-to-skin contact, although contact with an infected person's shed skin can also transmit the virus. Infection via the environment is more likely to occur if the skin is macerated and in contact with roughened surfaces, for example, in swimming pools and communal washing areas. After being established in the epithelial cells, the virus stimulates basal cell division to produce the characteristic lesion. Patients, especially children, should be warned not to pick, bite or scratch warts because doing so can allow viral particle shedding to penetrate skin breaks. This process is known as autoinoculation and is responsible for multiple lesions becoming established and transferred to other parts of the body.

Arriving at a differential diagnosis

Warts and verrucas are not difficult to diagnose. However, pharmacists must be able to recognize other similar conditions that superficially look like warts and verrucas (Table 9.20). Asking symptom-specific questions helps to establish a differential diagnosis (Table 9.21).

Clinical features of warts and verrucas

Warts

Warts most often occur on the backs of the hands, fingers and knees, either singly or in crops. When examined, the wart appears as a raised hyperkeratotic papule with thrombosed black vessels often visible as black dots within the wart. They tend to be rough textured and skin coloured and are usually less than 1 cm in diameter (Fig. 9.30).

Table 9.20
Causes of wartlike lesions and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	Common warts and verrucas
Likely	Corns Molluscum contagiosum
Unlikely	Actinic keratosis Plane warts Seborrhoeic keratosis
Very unlikely	Basal cell carcinoma

Table 9.21
Specific questions to ask the patient: Human papillomavirus

Question	Relevance
Age of patient	Warts are unusual in very young children, such as infants. Young children and adolescents are most likely to get warts, but this is also the age group in which molluscum contagiosum is most prevalent. In older people, conditions such as seborrhoeic warts, actinic keratosis and malignancy become more prevalent.
Location	Warts are common on the hands and knees. Verrucas are usually on the weight-bearing parts of the sole. Plane warts often affect the face and hands. Corns affect the tops of the toes. Actinic keratosis affects sun-exposed areas.
Associated symptoms	Itching and bleeding are associated with actinic keratosis or malignancy. Pain on walking is often associated with verrucas.
Look of the lesion	Typically, warts have a cauliflower appearance and are raised and pale. Lesions with a reddish hue or that change colour should be suspected as being malignant. Lesions that are raised, smooth and have a central dimple suggest molluscum contagiosum.

Verrucas

Verrucas are found on the soles of the feet, usually in weight-bearing areas, for example, on the metatarsal heads or heel. Owing to constant pressure imparted on the sole of the foot, the normal outward

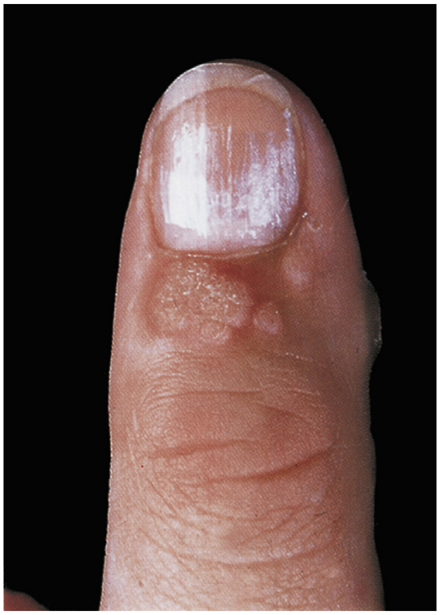

Fig. 9.30 Common wart. (From Wilkinson, J., Shaw, S., & Orton, D. [2004]. *Dermatology in focus.* Churchill Livingstone.)

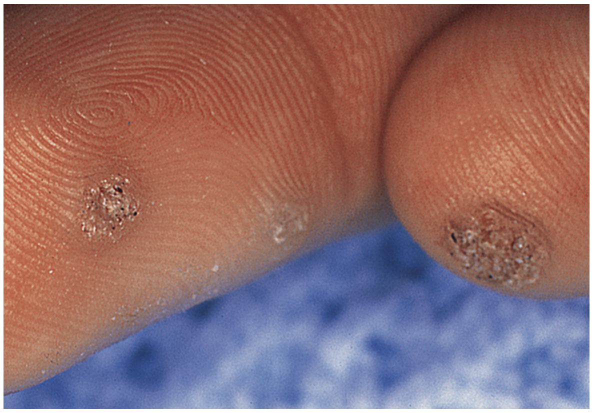

Fig. 9.31 Verruca. (From Gawkrodger, D. J. [2007]. *Dermatology: An illustrated colour text* [4th ed.]. Churchill Livingstone.)

expansion of the wart is thwarted and instead grows inward. Pressure on nerves can then cause considerable pain, and patients often complain of pain when walking. Inspection of the lesion normally reveals tiny black dots (thrombosed capillaries) on the surface (Fig. 9.31). Owing to keratin buildup, this characteristic sign might not be visible unless the hardened skin is first shaved away. Verrucas, like warts, are rarely larger than 1 cm in diameter and can occur singly or in crops. A number of closely located plantar warts can coalesce to form a large single plaque termed a 'mosaic wart'.

Conditions to eliminate

Likely causes

Corns

Hard corns and plantar warts can be confused. However, the location of corns tends to be on the tops of toes compared with verrucas, which appear on the soles of the feet.

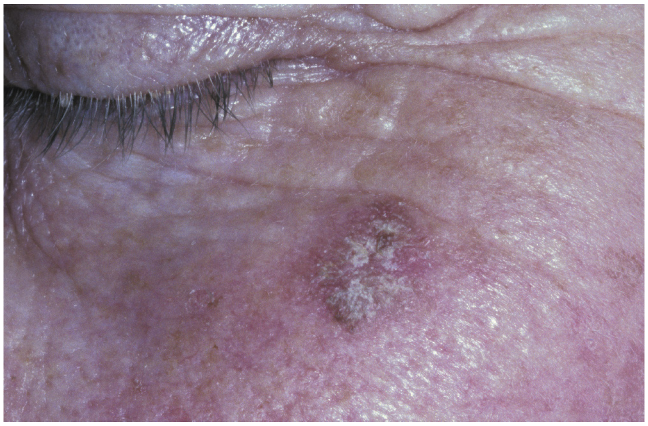

Fig. 9.32 Actinic keratosis. (From [2024]. *Oral and maxillofacial pathology* [5th ed.].)

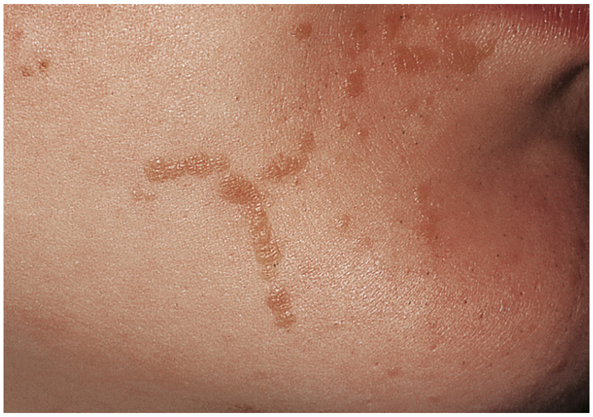

Fig. 9.33 Plane warts. (From Gawkrodger, D. J. [2007]. *Dermatology: An illustrated colour text* [4th ed.]. Churchill Livingstone.)

Molluscum contagiosum

Molluscum contagiosum is caused by a poxvirus and primarily affects children younger than 5 years old. It presents with multiple lesions, usually on the face and neck or trunk. The lesions resemble common warts, but each raised papule tends to be smooth and dome shaped with a central dimple; the latter is a useful diagnostic point (see Fig. 11.8). Lesions tend to be between 1 and 5 mm in diameter. The condition is self-limiting and resolves without medical intervention.

Unlikely causes

Actinic keratosis

Seen in older people, actinic keratosis occurs on parts of the body that are exposed to long-term sun exposure (e.g., head, forearms, hands). They begin as small rough spots that can resemble warts (Fig. 9.32). Other symptoms include tenderness, itchiness and burning.

Plane warts (flat warts or verruca plana)

These most frequently occur in groups on the face and the back of the hands. They are small (1–5 mm in diameter), are slightly raised and can take on the skin colour of the patient (Fig. 9.33).

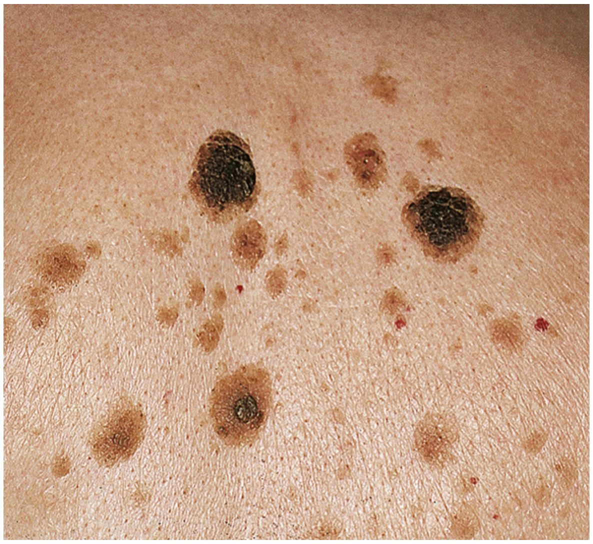

Fig. 9.34 Seborrhoeic keratosis. (From Gawkrodger, D. J. [2007]. *Dermatology: An illustrated colour text* [4th ed.]. Churchill Livingstone.)

Seborrhoeic keratosis

Seborrhoeic keratosis (also known as *seborrhoeic warts* or *basal cell papillomas*) are benign growths that are increasingly common with increasing age. They usually occur on the trunk and present as raised, often multiple lesions that have a superficial 'stuck-on' or waxy appearance (Fig. 9.34). Lesions are usually brown but can range in colour from pink to black.

Very unlikely causes

Basal cell carcinoma

This typically occurs in older people, especially when there is a history of prolonged skin exposure. Males are twice as likely to be affected. Lesions are wartlike but can itch and over time can ulcerate or change colour (Fig. 9.35).

Red flags indicative of referral: Warts and verrucae

Reason for referral	Why referring	Timeframe for referral
• Anogenital warts • Multiple and widespread warts	• Outside scope of OTC treatment	• As soon as practicable
• Diabetic patients • Lesions on the face	• Treatment options can cause skin damage	• Nonurgent
• Patients older than 50 years presenting with a first-time wart • Lesions that itch or bleed without provocation • Lesions that have grown and changed colour	• Potential sinister pathology	• Urgent referral to a GP

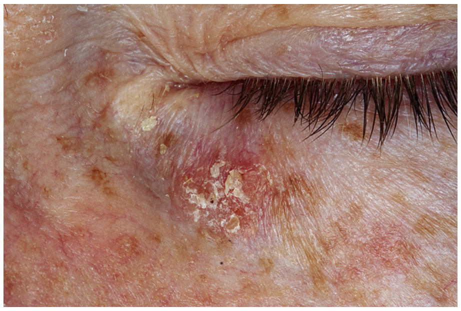

Fig. 9.35 Actinic keratosis and carcinoma. (From Habif, T. P., Chapman, M. S., Dinulos, J. G. H., & Zug, K. A. [2018]. *Skin disease: Diagnosis and treatment* [4th ed.]. Elsevier.)

Evidence base for over-the-counter medication

A Cochrane review (Kwok et al., 2012) investigated topical treatments for treating nongenital warts. This review identified 85 trials (n = 8815 participants) that included a range of different treatments. Although the quality of the trials was low because of poor methodology and reporting. Salicylic acid appeared to be both effective and safe but only modestly effective in terms of size of effect (50% cure rates). Cure rates were higher for common warts than verrucas.

Salicylic acid is often combined with other ingredients, in particular lactic acid. However, there is no evidence to support greater efficacy when lactic acid (or another ingredient) is added.

Other agents that are commercially available include glutaraldehyde and silver nitrate pencils. Information regarding their effectiveness stems from small-scale or poorly designed studies, and they should not be routinely recommended.

Adherence with treatment has been identified as a limiting factor in the cure rate for warts and verrucas. One study that investigated Occlusal (salicylic acid 50%) reported an 90% cure rate after only 2 weeks of therapy (Parish et al., 1999). This might be an alternative option for patients whose adherence could be questioned. However, the study had a poor design and had only a small number of patients, so the results must be viewed with caution.

Cryotherapy using liquid nitrogen has been used for many years as a treatment of recalcitrant or widespread warts. A Cochrane review by Kwok et al. (2012) found no evidence that cryotherapy was more effective than salicylic acid. Cryotherapy is beneficial for hand warts but not verrucas. It is a more painful, hazardous and expensive treatment compared with salicylic acid.

This review did not consider OTC freezing treatments that contain dimethyl ether and propane (e.g., Bazuka subzero, Wartner products). It has been reported that these are not as effective as liquid nitrogen because they only achieve temperatures of around – 57°C compared with – 196°C (Lynch et al., 2014).

Summary

Any salicylic acid–based product should have modest success rates in clearing warts and verrucas after a 12-week treatment period,

HINTS AND TIPS BOX 9.4: VERUCCAS AND WARTS

Length of treatment	- Patients should be told that it is a slow process. Treatment commonly lasts 3 months.
Cure rates	- There is some evidence that resolution of verrucas might be enhanced by soaking the verruca before application or occlusion of the site (by use of plasters or collodion-like vehicle) to aid penetration.
Salatac gel	- The gel forms an elastic film after application. This must be removed every time before the gel can be reapplied.

providing that patient adherence is good. If treatment has been unsuccessful with salicylic acid, a second-line agent should be considered such as cryotherapy, but this should be performed through the doctor. OTC freezing products should not be recommended based on a lack of evidence and the potential for adverse side effects associated with their use.

Practical prescribing and product selection

Prescribing information relating to specific products used to treat warts and is summarised in Table 9.22; useful tips relating to patients presenting with warts and verrucas are given in the 'Hints and tips' in Box 9.4.

Because most warts and verrucas spontaneously resolve, treatment is not always needed. Before recommending treatment, determine from the patient how much impact the wart or verruca has and assess their ability to adhere to treatment.

Salicylic acid products (e.g., Bazuka Extra Strength [26%], Occlusal [26%], Verrugon [50%]) and salicylic acid–lactic acid combinations [e.g., Bazuka, Duofilm, Salactol, Salactac])

Before using a salicylic acid–based product, the affected area should be soaked in warm water and towelled dry. The surface of the wart or verruca should be rubbed with a pumice stone or emery board to remove any hard skin. A few drops of the product should be applied to the lesion, taking care to localize the application to the affected area. The procedure should be repeated daily. Salicylic acid can be recommended to most patients, although people with diabetes are a notable exception. Salicylic acid does not interact with any medicines. It can cause local skin irritation and because of its destructive action should be kept away from unaffected skin.

Silver nitrate

To use silver nitrate pencils (e.g., Avoca), the tip must first be moistened and then applied to the wart or verruca for 1 to 2 minutes. This should be repeated after 24 hours. It is recommended that three applications be used for warts and six applications for verrucas. Like other treatments, the process is destructive, and the surrounding skin should be protected.

References

Kwok, C. S., Gibbs, S., Bennett, C., Holland, R., & Abbott, R. (2012). Topical treatments for cutaneous warts. *Cochrane Database System Review, 9*, CD001781.

Lynch, M. D., Cliffe, J., & Morris-Jones, R. (2014). Management of cutaneous viral warts. *BMJ, 349*, G3339. https://doi.org/10.1136/bmj.g3339.

Parish, L. C., Monroe, E., & Rex, I. H. (1999). Treatment of common warts with high-potency (26%) salicylic acid. *Clinical Therapeutics, 10*, 462–466.

Table 9.22
Practical prescribing: Summary of medicines for warts and verrucas

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Salicylic acid					
Bazuka extra	Older than 2 years	Local skin irritation	None	Avoid in patients with diabetes	OK
Occlusal	No lower age stated				
Verrugon					
Salicylic acid combined with lactic acid					
Bazuka	Older than 2 years	Local skin irritation	None	Avoid in patients with diabetes	OK
Duofilm	Older than 2 years				
Salactol	No lower age stated				
Salatac					
Silver nitrate					
	No lower age stated	Local skin irritation	None	Avoid in patients with diabetes	OK

Further reading

Dall'oglio, F., D'Amico, V., Nasca, M. R., et al. (2012). Treatment of cutaneous warts: An evidence-based review. *American Journal of Clinical Dermatology, 13*, 73–96.

Johnson, L. W. (1995). Communal showers and the risk of plantar warts. *The Journal of Family Practice, 40*, 136–139.

Yazar, S., & Basaran, E. (1994). Efficacy of silver nitrate pencils in the treatment of common warts. *The Journal of Dermatology, 21*, 329–333.

Corns and calluses

Background

Foot disorders can be broadly subdivided into those that result from opportunistic infection, trauma or incorrect distribution of pressure. This section discusses the latter.

Prevalence and epidemiology

The exact prevalence of corns and calluses is not known. Surveys have indicated that up to 19% of working people complain of corns and calluses (Springett et al., 2003). Corns and calluses tend to be more often seen in older patients and females.

Aetiology

Corns form because of a combination of friction and intermittent pressure against one of the bony prominences of the feet (e.g., heel and metatarsal heads). Inappropriate footwear is frequently the cause. Continued pressure and friction results in hyperkeratoses (excessive skin growth of the keratinized layer), leaving even less space between the shoe and the foot, and therefore the corn is pressed even more firmly against the underlying soft tissues and bone.

Callus formation is also caused by constant friction and pressure. Calluses can be beneficial, providing a natural barrier to objects and protecting underlying tissues; however, when such a thickened mass of skin occurs in abnormal places (e.g., border of the big toe), pain is experienced.

Arriving at a differential diagnosis

The diagnosis of corns and calluses is best done by appearance through visual inspection. The differential diagnosis should be straightforward and is usually between corns, calluses and verruca. Asking symptom-specific questions helps to establish a differential diagnosis (Table 9.23).

Clinical features of corns

Corns have been classified into a number of types, although only soft and hard corns are commonly seen in practice. Hard corns (heloma durum) are generally located on the top of the toes. Corns exhibit a central core of hard grey skin surrounded by a painful, raised, yellow ring of inflammatory skin. Any of the toes can be affected, but a corn is most common on the second toe. Soft corns (heloma molle) form between the toes rather than on the tops of toes and are caused by pressure exerted by one toe against another. They have a whitened appearance and remain soft because of moisture being present between the toes, causing maceration of the corn. Soft corns are most common in the fourth web space.

Table 9.23
Specific questions to ask the patient: Corns and calluses

Question	Relevance
Location	- Lesions on the tops or between the toes suggest a corn compared with verrucas, which are on the plantar surface of the foot.
Aggravating or relieving factors	- Pain experienced with corns is a result of pressure between footwear and the toes. If footwear is taken off, then the pain is relieved. - Pain associated with verrucas is felt whether or not footwear is worn.
Appearance	- Corns and calluses appear as white or yellow hyperkeratinized areas of skin. - Verrucas show black thrombosed capillaries seen as black dots on the surface of the verruca.
Previous history	- Patients with corns often have a previous history of foot problems. The cause is usually poorly fitting shoes, such as high heels.

Clinical features of calluses

Calluses, depending on the cause and site involved, can range in size from a few millimetres to centimetres. They appear as flattened, yellow-white, thickened skin. In females, the balls of the feet are a common site. Other sites that can be affected are the heel and lower border of the big toe. Patients frequently complain of a burning sensation, resulting from fissuring of the callus.

Conditions to eliminate

Verrucas

Verrucas can be mistaken for a corn or callus, although verrucas tend to have a spongy texture, with the central area showing tiny black spots. They are also rarely located on or between the toes and commonly occur in younger patients more than corns and calluses.

Bunions

Bunions are 10 times more common in females than in males and are associated with wearing tight shoes. Initially, irritation of skin by ill-fitting shoes causes bursitis of the big toe. It presents at the

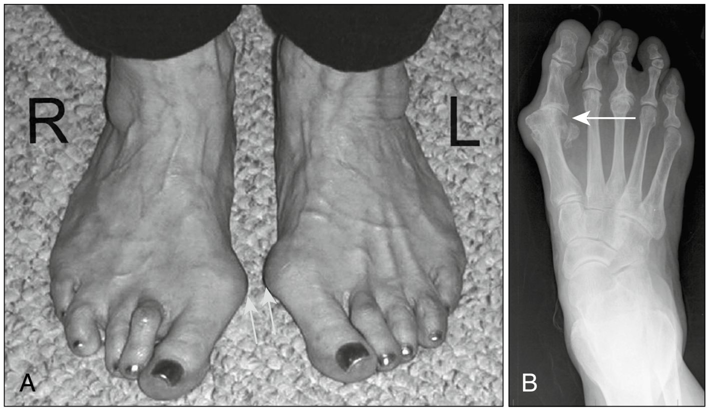

Fig. 9.36 Bunions (A and B). (From Hochberg, M.C. [2019]. *Rheumatology* [7th ed.]. Philadelphia, Elsevier.)

first metatarsal joint, causing medial big toe pain and difficulty wearing footwear (Fig. 9.36). The skin may be red and inflamed.

Red flags indicative of referral: Corns and calluses

Reason for referral	Why referring	Timeframe for referral
• Discomfort or pain causing difficulty in walking	• Better assessed and managed by a podiatrist	• Nonurgent but as soon as practicable
• Impaired peripheral circulation (e.g., with diabetes)	• Needs assessment by podiatrist or doctor	

Evidence base for over-the-counter medication

Corns and calluses are caused by friction and pressure. Removal of the precipitating factors results in resolution of the problem. Therefore, preventive measures should form the mainstay of treatment. Correctly fitting shoes are essential to help prevent corn and callus formation. Patients should be encouraged to wear open shoes such as sandals or flip-flops. If pressure and friction persist when correctly fitted shoes are worn, patients can obtain relief by shielding or padding. Moleskin or thin podiatry felt placed around the corn allows pressure to be transferred from the corn to the padding. Specific proprietary products are available for such purposes. In callus formation, a shock-absorbing insert such as a metatarsal pad is useful to relieve weight off the callus and thus reduce stress on the plantar skin.

Practical prescribing and product selection

Treatment should be avoided, if possible, but if deemed appropriate, products used to treat corns and calluses are the same as those used for warts and verrucas. Prescribing information relating to specific products used to treat corns and calluses is therefore discussed in the section on OTC medication for warts and verrucas. However, a number of proprietary products are marketed for people with corns and calluses, for example, products in the Carnation and Scholl range. These products contain high concentrations of salicylic acid (usually 40%) that are surrounded by a nonmedicated, self-adhesive ring.

Reference

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Further reading

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Silfverskiold, J. P. (1991). Common foot problems. Relieving the pain of bunions, keratoses, corns and calluses. *Postgraduate Medicine, 99*, 193–199.

Scabies

Background

Scabies can be defined as an intensely pruritic skin condition caused by the mite *Sarcoptes scabiei*. The diagnostic burrows are small, but scratching often makes them difficult to see.

Prevalence and epidemiology

The incidence of scabies in the United Kingdom is low (0.1% of the population), but epidemics can occur on a cyclic basis approximately every 15 to 20 years. Outbreaks in schools and care homes are not uncommon. In temperate climates (e.g., the United Kingdom), scabies appears to be more prevalent in urban areas and in the winter months.

Aetiology

The mites are transmitted by direct physical contact (e.g., holding hands, hugging or sexual contact), although transmission through casual contact such as shaking hands is unlikely. Mating occurs on the skin surface, after which the female mite burrows into the stratum corneum to lay eggs. The faecal pellets left in the burrow cause a local hypersensitivity reaction and are assumed to cause the release of inflammatory mediators that trigger an allergic reaction invoking intense itching. This normally takes 15 to 20 days in a primary infestation but can take up to 6 weeks to develop. In subsequent infestations, this hypersensitivity reaction develops much more quickly. During the asymptomatic period, the mite can be passed onto others unknowingly. The eggs hatch and mature in 14 days, after which the cycle can begin again.

Arriving at a differential diagnosis

A definitive diagnosis of scabies is confirmed by extraction of the mite from its burrow, although in primary care, this is rarely performed, and a differential diagnosis is made on clinical appearance, patient history and symptoms reported by close family. Confusion

Table 9.24
Causes of scabies-like rash and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Allergic contact dermatitis • Insect bites
Likely	• Scabies
Unlikely	• Impetigo • Pompholyx
Very unlikely	• Dermatitis herpetiformis • Prurigo nodularis

Table 9.25
Specific questions to ask the patient: Scabies

Question	Relevance
Visible signs of the mite	• Burrows might be visible. They are up to 1 cm long and blue-grey in colour, although in practice, they are often difficult to see because of scratching from the patient.
Location and distribution of the rash	• Finger webs, the sides of the fingers and the wrists suggest scabies. • Face and extremities suggest impetigo. • Buttocks, elbows and knees suggest dermatitis herpetiformis. • Palms of the hands suggest pompholyx. • Asymmetrical crops of vesicles or papules suggest insect bites. • A symmetrical rash suggests dermatitis herpetiformis or prurigo nodularis.
History of the presenting complaint	• Often, people with scabies are care workers looking after institutionalized people. • A positive history of skin itching in other family members increases the likelihood that the patient has scabies. • If contact dermatitis is suspected, questioning should reveal something that precipitated the rash, or there may be a past history of similar skin lesions.

can arise from mistaking scabies for other pruritic skin disorders (Table 9.24). Asking symptom-specific questions helps to establish a differential diagnosis (Table 9.25).

Clinical features of scabies

Severe generalized pruritus, especially at night, is the hallmark symptom of scabies. Lesions are typically seen on the wrists, interdigital spaces of the fingers and extensor aspects of the limbs (e.g., back of the elbow, front of the knee) as well as the penile and scrotal skin in males and beneath the breasts and nipples of females (Fig. 9.37). Infants who are not yet walking may have marked sole involvement. The rash typically shows small red papules, but the surrounding skin is often sore and damaged because of itching.

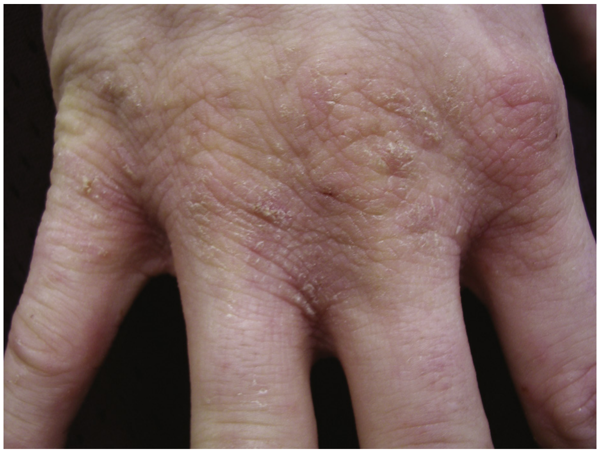

Fig. 9.37 Scabies. (From [2019]. *Nelson essentials of pediatrics* [8th ed].)

Conditions to eliminate

Most likely causes

Dermatitis

Both atopic and contact dermatitis present with moderate to intense itchy red rash. In contact dermatitis, the rash follows exposure to an irritant, and in atopic dermatitis, there should be a history of dry skin and lesions affecting the face, trunk or limbs depending on the age of the patient. Papules or vesicles may be present.

Insect bites

Itching papules, which can be intense, are the hallmark symptom of insect bites. The is usually papules can become firm and last several days. Occasionally, these blister normally as a result of scratching, and secondary bacterial infection can then occur. Bites often tend to be in groups and are asymmetrical and occur on exposed areas (e.g., the hands).

Unlikely causes

Impetigo

Common in children, this tends to affect the face, extremities and hands. Lesions show a mixture of macules and vesicles. Superficially, it can look like scabies, but when vesicles rupture, they release exudate that forms a golden yellow-brown crust. Itch is also not intense compared with scabies. Please refer to the section on impetigo later in this chapter for its differentiation from other problems.

Pompholyx (dyshidrotic eczema)

Pompholyx refers to the presence of crops of intensely itchy, small vesicles or blisters on the palms of the hands and occasionally on the soles of the feet (Fig. 9.38). Stress and heat are known to precipitate the condition.

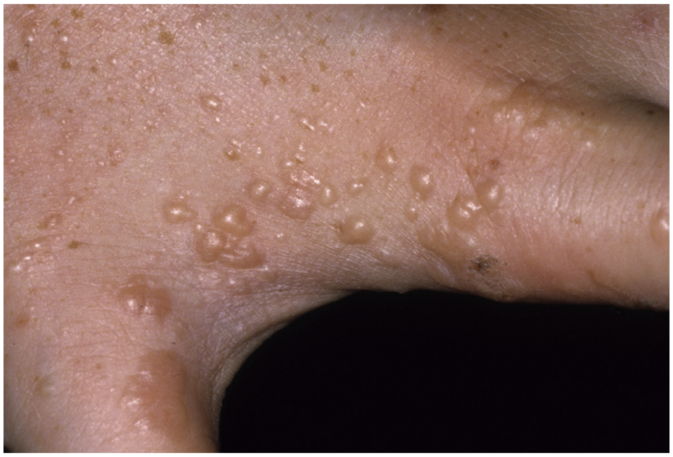

Fig. 9.38 Pompholyx. (From [2023]. *Andrews' diseases of the skin clinical atlas* [2nd ed.].)

Very unlikely causes

Dermatitis herpetiformis

Dermatitis herpetiformis is a rare condition characterized by intense itchy clusters of papules and vesicles. It is more often seen in middle-aged people, especially in males. It commonly involves the buttocks, elbows, knees and sacral region, with hand involvement being rare. The lesions usually exhibit a symmetrical distribution. On investigation, up to 90% of patients are found to have a gluten enteropathy.

Prurigo nodularis

This a rare condition characterized by intensely itchy firm nodules that tends to affect older people. The itch often disturbs sleep. It can appear anywhere on the body but is most common on the arms, legs, back and torso in a symmetrical distribution.

Table 9.26 summarises the presentation of each condition.

Red flags indicative of referral: Scabies

Reason for referral	Why referring	Timeframe for referral
• Intensely itchy papules or nodules distributed in a symmetrical pattern in an older person	• Suggests dermatitis herpetiformis or prurigo nodularis	• As soon as practicable
• Weeping or crusting lesions	• Secondary infection of the skin; may require antibiotics	
• Severe and extensive symptoms • Institutional outbreaks	• Outside the scope of community pharmacy	• Urgent GP referral

Evidence base for over-the-counter medication

The efficacy and safety of scabicidal agents are difficult to determine because of limited trial data. Benzyl benzoate, crotamiton, permethrin, lindane and malathion have all been used. A Cochrane review (Strong & Johnstone, 2007) identified 22 trials (n = 2676 participants) comparing permethrin, crotamiton, benzyl benzoate and lindane. Topical permethrin was found to have high cure rates and to be the most effective scabicidal agent.

Practical prescribing and product selection

Permethrin is the medicine of choice, although the details of other products are listed for completeness. Prescribing information relating to specific products used to treat scabies is discussed and

Table 9.26
Condition summary of scabies-like conditions

Condition	Location other than hands and wrists	Lesion appearance	Itch	Positive family or social history
Scabies	Unusual	Red papules to vesicles	Intense	Yes
Allergic contact dermatitis	Often (depends on type of dermatitis)	Red scaling rash that might crust over because of scratching	Moderate to intense	No
Dermatitis herpetiformis	Flexures	Papules and vesicles	Intense	No
Impetigo	Yes	Red lesions that weep and crust over to a brown-yellow crust	Mild to moderate	No
Insect bites	Often	Red papules through to vesicles	Moderate to intense	Possible
Pompholyx	Unusual	Vesicles	Intense	No
Prurigo nodularis	Legs, back or torso	Nodules	Intense	No

Table 9.27
Practical prescribing: Summary of medicines for scabies

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Permethrin	Older than 2 months	None	None	OK	OK
Malathion	Older than 6 months				
Benzyl benzoate	Older than 12 years	Burning or irritation			Avoid in breastfeeding until the product has been washed off

HINTS AND TIPS BOX 9.5: SCABIES

Application	• UK guidelines state that treatment should be applied to the whole body, including the scalp, neck, face and ears.
Itching after treatment	• Pruritus can persist for up to 1 month after treatment. Itch can be treated with crotamiton. • Antihistamines (e.g., chlorphenamine) appear to have a limited role in relieving itch, but their sedative effect might be useful for temporary help in aiding sleep.
Hygiene measures	• Clothes, towels and bed linens should be machine washed (at ≥60°C) at the time of the first application of treatment to prevent reinfestation and transmission to others. • They should then be dried in a hot dryer or sealed in a plastic bag for at least 72 hours.
Who to treat?	• It is important that all people in the same household and in close contact with the affected individual be treated at the same time to prevent reinfection, even though they might be asymptomatic (latent period before itch develops).
Reapplication	• If hands are washed during contact time, then treatment must be reapplied to those areas immediately.

summarised in Table 9.27. Useful tips relating to patients presenting with scabies are given in the 'Hints and tips' in Box 9.5.

Permethrin (Lyclear Dermal Cream)

General guidance for application is that adults and children older than 12 years should use up to a full tube as a single application. Some adults might need to use more than one tube to ensure total body coverage, but a maximum of two tubes (60 g in total) is recommended for a single application. For children younger than 12 years, the manufacturers suggest the following: an eighth of a tube for those 2 months to 1 year ¼ tube for those between 1 to 5 years of age and ½ tube for those between 6 and 12 years of age. The whole body should be washed thoroughly 8 to 12 hours after treatment. Treatment should be repeated after 7 days. Transient skin irritation can occur on application but is uncommon.

Malathion (Derbac M)

The liquid can be used on adults and children older than 6 months old and is left on for 24 hours. Treatment should be repeated after 7 days.

Benzyl benzoate

It should be applied to the whole body and repeated the following day. A third application may be required in some cases. It causes skin irritation and a transient burning sensation in approximately 25% of patients. This is usually mild but can occasionally be severe in sensitive individuals. In the event of a severe skin reaction, the preparation should be washed off using soap and warm water. It is also irritating to the eyes, which should be protected when applied to the scalp.

Reference

Strong, M., & Johnstone, P. (2007). Interventions for treating scabies. *Cochrane Database System Review, 3*, CD000320.

Further reading

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Chosidow, O. (2006). Clinical practices. Scabies. *The New England Journal of Medicine, 354*, 1719–1727.

FitzGerald, D., Grainger, R. J., & Reid, A. (2014). Interventions for preventing the spread of infestation in close contacts of people with scabies. *Cochrane Database System Review, 2*, CD009943.

Acne vulgaris

Background

Only about 30% of people with acne consult their doctors, and most patients presenting in the community pharmacy generally seek appropriate advice on correct product selection rather than wanting someone to put a name to their rash. Diagnosis is usually straightforward. Most cases seen in the pharmacy setting are mild and can be managed appropriately without referral to a doctor. However, more persistent and severe cases need referral for more potent topical or systemic treatment. Acne often causes significant psychological impact, such as lack of confidence, low self-esteem and depression.

Prevalence and epidemiology

Acne lesions develop at the onset of puberty. Females therefore tend to develop acne at an earlier age than males. The peak incidence for females is between the ages of 14 and 17 years compared with 15 and 19 years for males. Evidence has shown that the average age when acne develops has decreased by 1 year over the past 30 or 40 years, from 15.9 years old in 1979 to 15 in 2007 (Goldberg et al., 2011). Although acne is closely associated with adolescence, up to 12% of females and 3% of males aged 25 to 40 years continue to get facial acne or develop acne (late-onset acne) after adolescence. Acne persists in a very small proportion of patients (5% of females and 1% of males) into their 40s. There might be a familial tendency to acne, and it is slightly more common in males, who also experience more severe involvement. In addition, White patients are more likely to experience moderate to severe acne than Black patients, although Black skin is prone to worse scarring. Certain jobs can predispose patients to acne-like lesions and are commonly associated with long-term contact with oils.

Aetiology

At the onset of puberty, a cascade of events takes place, resulting in the formation of noninflammatory and inflammatory lesions. In response to increased testosterone levels, the pilosebaceous gland begins to produce sebum; if the sebaceous glands become oversensitive to testosterone, they produce excess oil, and the skin becomes greasy, a hallmark of acne. At the same time, epithelial cells lining the follicle undergo change. Before puberty, dead cells are shed smoothly out of the ductal opening, but at puberty, this process is disrupted, and in patients with acne, these cells develop abnormal cohesion, partially blocking the opening and effectively reducing sebum outflow. Over time, the opening of the duct becomes blocked, trapping oil in the hair follicle. Bacteria, particularly *Cutibacterium acnes* (formerly known as *Propionibacterium acnes*), proliferate in the stagnant oil, stimulating cytokine production, which in turn produces local inflammation, leading to the appearance of a spot. In response to the proliferation of bacteria, white blood cells infiltrate the area to kill the bacteria and in turn die, leading to pus formation. The pustule eventually bursts on the skin surface, carrying away the plug. The whole process can then start again.

Table 9.28
Grading of acne

Mild acne	• This consists mainly of noninflammatory comedones, with few inflammatory (papulopustular) lesions, mainly confined to the face.
Moderate acne	• This can be described as having many inflammatory lesions that are not confined to the face. Lesions are sometimes painful, and there is a possibility of mild scarring.
Severe acne	• This has all the characteristics of moderate acne plus the development of nodules and cysts. Lesions are often widespread, involving the upper back and chest. Scarring usually results. • Acne of any severity causing psychological upset should be classified as severe.

Table 9.29
Causes of lesions with acne-like appearance and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Acne
Likely	• Perioral dermatitis • Rosacea
Unlikely	• Folliculitis
Very unlikely	• Polycystic ovary syndrome

Arriving at a differential diagnosis

The first step in the management of acne is to assess severity because this will shape management decisions. Several rating scales have been developed with the aim of trying to grade the severity of an individual's condition. None has gained universal acceptance, although most dermatology texts simply grade the severity of acne into mild, moderate or severe. Table 9.28 describes mild, moderate and severe acne presentations. OTC treatment should be limited to patients with mild to moderate acne. Acne should present little difficulty in diagnosis, although a small number of other conditions need to be considered (Table 9.29).

Clinical features of mild acne vulgaris

Acne is characterized by comedones, papules and pustules on the face (99% of cases), chest (15%) and upper back (60%). Patients with mild acne characteristically have predominantly open and closed comedones, with a small number of active lesions normally confined to the face (Fig. 9.39). Acne can sometimes consist predominately of blackheads and whiteheads, with very few inflammatory lesions. This is termed *comedonal acne* and occurs most commonly in Asian and Afro-Caribbean patients.

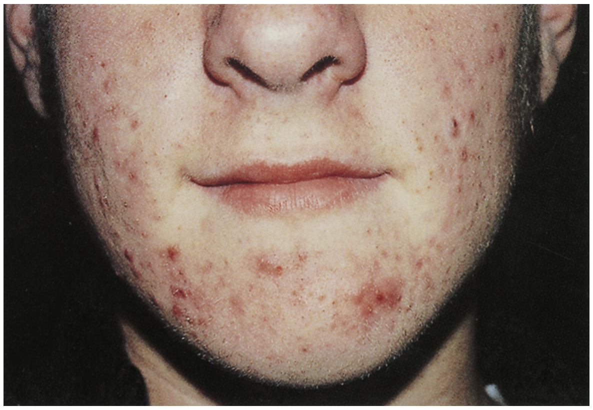

Fig. 9.39 Mild acne. (From Fleischer, A. B., Feldman, S., Clayton, E., & Katz, A. (2000). *20 common problems.* McGraw-Hill.)

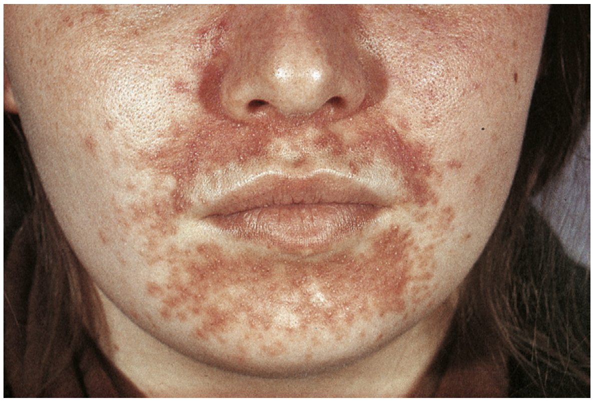

Fig. 9.40 Perioral dermatitis. (From Wilkinson, J., Shaw, S., & Orton, D. (2004). *Dermatology in focus.* Churchill Livingstone.)

Conditions to eliminate

Likely causes

Perioral dermatitis

Perioral dermatitis tends to affect young females between 20 and 45 years of age and exhibits an acne-like rash, generally around the mouth and nasolabial folds and eyes (Fig. 9.40). The surrounding skin is often dry. Itching and burning can also be present, and the rash can take on a dermatitis-like quality.

Rosacea

Rosacea is an inflammatory disease of the skin follicles. It is uncertain what causes rosacea, although successful treatment with antibiotics suggests that bacterial pathogens play a significant role in the disease. It is normally seen in patients older than 40 years of age and is more common in females than in males. It is typically characterized by recurrent flushing and blushing of the central face, especially the nose and medial cheeks. Crops of inflammatory papules and pustules are also a common feature, although comedones are not present (see Fig. 9.15). Patients may also complain of skin dryness and skin discomfort. Eye symptoms (e.g., conjunctivitis and blepharitis) are also often present.

Unlikely causes

Folliculitis

Folliculitis may arise as hairs regrow following activities such as waxing, shaving or plucking. Symptoms should be transient with an identifiable cause.

Medicine-induced acne

A number of medicines can produce acne-like lesions. Steroids (oral or topical) are commonly implicated. Other medicines associated include lithium, oral contraceptives (especially those with high progestogen levels), anticonvulsants, azathioprine and rifampicin.

Very unlikely cause

Polycystic ovary syndrome

A clinical manifestation of this condition can be acne vulgaris. Suspect polycystic ovary syndrome if any female who has menstrual irregularity (infrequent or no periods) and exhibits hirsutism or is overweight must be referred for further investigation.

Red flags indicative of referral: Acne

Reason for referral	Why referring	Timeframe for referral
• Moderate or severe acne • OTC treatment failure	• Generally require antibiotic therapy	• As soon as practicable
• People younger than 10 years and older than 40 years	• Acne is uncommon in these age groups	
• Females who have acne and menstrual irregularity	• Suggests polycystic ovary syndrome	

Evidence base for over-the-counter medication

The aim of treatment is to clear the lesions and prevent scarring. It is important to show understanding and empathy when advising patients, given that acne is predominantly a condition that affects adolescents, a time when appearance is all important. It is worth taking a few minutes to counsel patients about their condition, allay fears and make sure that their expectations of treatment are realistic.

OTC acne treatments contain benzoyl peroxide, salicylic acid, sulphur, nicotinamide or an antibacterial.

Benzoyl peroxide

Benzoyl peroxide exerts its main effect by reducing the concentration of *C. acnes* by releasing oxygen into the anaerobic microenvironment. Bacteria cannot develop resistance to this mode of action. Many studies have investigated the efficacy of benzoyl peroxide. It has been proven to be effective, especially in mild to moderate acne. However, there is no evidence to suggest that 10% benzoyl peroxide is more effective than lower strengths.

A variety of other agents have been compared against or in combination with benzoyl peroxide. None of these products have shown to be significantly better than benzoyl peroxide alone.

Evidence of efficacy for salicylic acid and sulphur is poor. Both agents have been used for many years based on their keratolytic action, but according to current evidence, they are best avoided. Nicotinamide is a more recent addition to the OTC market. Data suggest that it is as effective as clindamycin 1% gel; however, no randomized controlled trials seem to have been conducted to support this finding (Shalita et al., 1995).

Complementary treatments

Evidence is lacking to support the use of complementary treatments. A 2015 Cochrane review (Cao et al., 2015) found some low-quality evidence for reduction in acne lesions using bee venom or tee tree oil and in those following a low glycaemic load diet. However, these data were drawn from single trials of varying methodological quality.

Summary

First-line treatment of acne should be benzoyl peroxide, 2.5% or 5%. Patients should see an improvement in their symptoms after 6 weeks. If the patient's symptoms fail to improve in this time, referral to a doctor would be appropriate. However, if beneficial, treatment should be continued for at least 4 to 6 months.

Practical prescribing and product selection

Prescribing information is discussed and summarised in Table 9.30; useful tips relating to patients presenting with acne are given in the 'Hints and tips' in Box 9.6.

Benzoyl peroxide (e.g., Acnecide)

Benzoyl peroxide is usually applied once or twice daily, depending on the patient's response, although once-daily application is often sufficient. It should be applied to all areas of the skin where acne occurs and not just to the active lesions. It can cause drying, burning and peeling on initial application. If this occurs, the patient should be told to stop using the product for 1 or 2 days before starting again. Patients should therefore start on the lowest strength commercially available, especially if the patient has sensitive skin or has fair skin colour. Occasionally, patients experience contact dermatitis, although it has been reported to affect fewer than 1% of patients.

HINTS AND TIPS BOX 9.6: ACNE

Myths surrounding acne	- Sunshine helps to reduce acne: There is no convincing evidence that this is the case. - Chocolate causes spots: There is no proof that any food causes acne. - Stress causes acne: Stress cannot cause acne, although it can make it worse.
Applying benzoyl peroxide	- Benzoyl peroxide has a potent bleaching effect. It can bleach clothing and bed linen permanently. Patients should be advised to always wash their hands after applying the product.

Nicotinamide (Freederm)

Nicotinamide should be applied to the affected area twice daily after the skin has been washed using enough gel to cover the affected area. Like benzoyl peroxide, drying of the skin is the main side effect. If this occurs, the dose should be reduced to once daily.

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Table 9.30
Practical prescribing: Summary of medicines for acne

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Benzoyl peroxide	Not appropriate	Skin irritation, burning or peeling	None	None	OK
Nicotinamide		Dry skin, pruritus, erythema, burning or irritation			

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Cold sores (herpes simplex labialis)

Background

A cold sore is an infection caused by the herpes simplex virus (HSV). There are two main subtypes of the virus, HSV1 and HSV2. Cold sores are caused by HSV1, whereas HSV2 is most implicated in genital lesions.

Prevalence and epidemiology

HSV infection is one of the most encountered human viral infections. It is estimated that more than 90% of adults worldwide show serologic evidence of having been infected by HSV1, with 20% to 40% of people experiencing a cold sore at some time during their lifetimes.

Aetiology

Infection is spread by viral shedding into saliva and results from direct mucous membrane contact (e.g., kissing) at sites of abraded skin between an infected and uninfected individual. The virus then infects epidermal and dermal cells, causing skin vesicles. After primary infection, the virus travels to the sensory ganglia, where it lies dormant in the dorsal root ganglia of the trigeminal nerve until reactivation. After being reactivated (often triggered by some known stimulus), the virus migrates from these sensory ganglia to the outer layer of the skin of lips and forms cold sore lesions again.

Arriving at a differential diagnosis

Cold sores should not be too difficult to diagnose, although conditions such as impetigo can look similar (Table 9.31). Asking symptom-specific questions helps to establish a differential diagnosis (Table 9.32).

Table 9.31
Causes of cold sore-like lesions and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Cold sore
Likely	• Angular cheilitis • Impetigo
Unlikely	• Aphthous ulcer • Chickenpox
Very unlikely	• Behçet disease • Stevens-Johnson syndrome

Table 9.32
Specific questions to ask the patient: Cold sores

Question	Relevance
Onset	• Patients with cold sores often experience prodromal symptoms before the skin eruption. • No warning signs are present with impetigo and angular cheilitis.
Location	• Cold sores typically occur around the mouth. They can also occur around and inside the nose, but this is less common. • Impetigo also occurs in the same areas but is more prone to spread to other areas of the face or move to other parts of the body. • Angular cheilitis occurs at the corners of the mouth.
Trigger factors	• Stress, ill health, sunlight, viral infection (e.g., the common cold) and menstruation are all implicated in triggering cold sore attacks. • Triggers are not associated with other similar conditions.

Clinical features of cold sores

Patients typically experience prodromal symptoms of itching, burning, pain or tingling symptoms 6 to 48 hours before skin eruption. The lesions appear as blisters and vesicles with associated redness on the outer lip (Fig. 9.41). These crust over (usually within 24 hours), tend to be itchy and painful and might bleed. Lesions spontaneously resolve in approximately 10 days.

Many patients can identify a cause of their cold sore, with sunlight (UV light) reported to induce cold sores in 20% of those affected. Recurrence is common and lesions tend to occur in the same location. Most people with recurrent cold sores have approximately two episodes a year, but 5% to 10% of people can have six or more recurrences per year.

Conditions to eliminate

Likely causes

Angular cheilitis

Angular cheilitis can occur at any age but is more common in older patients who wear dentures. The corners of the mouth become

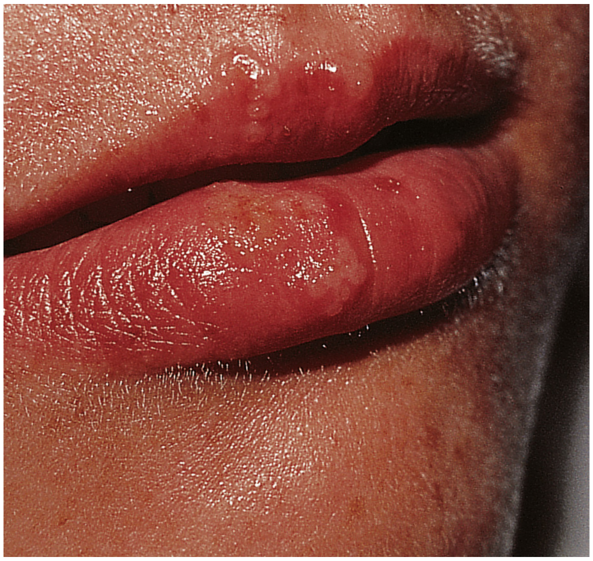

Fig. 9.41 Cold sore. (From White, G. [2004]. *Color atlas of dermatology* [3rd ed.]. Churchill Livingstone.)

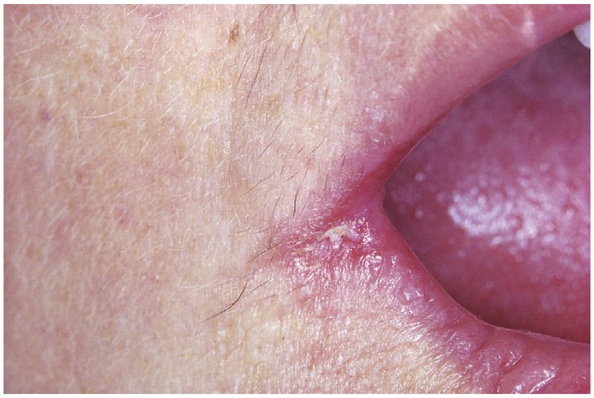

Fig. 9.42 Angular cheilitis. (From Cawson, R., et al. [2002]. *Essentials of oral pathology and oral medicine.* Churchill Livingstone.)

cracked, fissured and red. The lesions can become boggy and macerated and are slow to heal because movement of the mouth hinders healing of the lesions (Fig. 9.42). Prodromal symptoms are absent and generally do not itch or crust over, as is typical with cold sores.

Impetigo

Impetigo usually starts as a small, red, mildly itchy patch of inflamed skin that quickly develops into vesicles that rupture and weep. The exudate dries to a brownish-yellow sticky crust. The area around the mouth and nose is usually affected rather than the lip itself (see Fig. 11.7). For further information on impetigo, please refer to the section later in this chapter.

Unlikely causes

Aphthous ulcers

These can occur on the lip but tend to be on the inside rather than the outer part of the lip. For further information about ulcers, see the section on painful ulcers in Chapter 8.

Chicken pox

Facial involvement is very common in chickenpox. Vesicles appear in crops that burst and crust over and can therefore superficially look like cold sores. However, they tend not to appear on the lips and are itchier, and lesions spread to the trunk and limbs.

Very unlikely causes

Behçet disease

This is characterized by recurrent inflammatory skin lesions, eye problems (e.g., uveitis) and oral and genital ulcers. Eye symptoms and genital lesions are more prominent than skin and oral lesions. If oral ulcers are present, they tend in the oral cavity rather than on the lips.

Stevens-Johnson syndrome

Stevens-Johnson syndrome is a rare, acute, serious and potentially fatal skin reaction in which there are sheetlike skin and mucosal loss. It is nearly always caused by medications, with antibiotics commonly implicated. Lip or mouth ulcers are prominent and can be severe.

Red flags indicative of referral: Cold sores

Reason for referral	Why referring	Timeframe for referral
• Lesions that spread away from the lips and onto the face	• Impetigo more likely	• Same-day referral
• Skin lesions affecting areas other than the mouth	• Suggests impetigo or rare conditions such as Behçet or Stevens-Johnson syndrome	

Evidence base for over-the-counter medication

A number of products are marketed for the relief and treatment of cold sores. None has shown conclusively to be effective for its prevention and treatment. Products containing ammonia, zinc and phenol appear to have no evidence of efficacy. However, they might be useful in drying lesions and preventing secondary bacterial infections. Local anaesthetics (e.g., lidocaine) might be useful for mildly painful lesions. Only antivirals, which work by inhibiting the herpes virus DNA polymerase, have demonstrated clinical effectiveness. Orally, they are highly effective, but the evidence for topical administration is less conclusive. Trial data have shown them not to have a preventive effect (Chi et al., 2015). Regarding speeding up the resolution of established cold sores, if applied in the prodromal stage, the total healing is reduced by half to 1 day compared with no treatment.

A hydrocolloid patch is also available for the treatment of cold sores (Compeed Cold Sore Patch). One small study comparing Compeed patch with acyclovir 5% cream found similar efficacy in terms of self-reported global assessment of efficacy and time until healing (7.57 days for Compeed vs 7.03 days for acyclovir; $P = .37$)

(Karlsmark et al., 2009). However, the study had methodologic flaws casting doubt on the findings.

Summary

Aciclovir is the first-line therapy for the treatment of patients with cold sores. (Note that penciclovir has a marketing authorization for OTC sale, but currently there are no marketed products.) However, it should be used as soon as the patient experiences symptoms for it to have any effect.

Practical prescribing and product selection

Prescribing information relating to acyclovir is discussed and summarised in Table 9.33. For completeness, the table also contains other commonly used cold sore products; useful tips relating to patients presenting with cold sores are given in Hints and Tips Box 9.7.

Aciclovir (e.g., Cymex Ultra, Virasorb, Zovirax)

Aciclovir should be applied five times daily at approximately 4-hour intervals, and treatment should be continued for 5 days. Aciclovir can be used by all patient groups, including pregnant and breastfeeding females, although manufacturers advise caution because of limited data regarding the exposure of acyclovir in these patient groups. It has no drug interactions and causes only transient stinging after first application in the minority of patients.

HINTS AND TIPS BOX 9.7: COLD SORES

Sun-induced cold sores	• For patients in whom the sun triggers cold sores, a sun block should be used to help prevent recurrence.
Decrease risk of transmission	• Avoid kissing others. • Avoid touching the lesions. • Do not share towels. • Do not share items that could come into contact with lesions (e.g., lip balms). • Wash hands immediately after applying antiviral product and if the lesions are touched.

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Dermatitis

Background

The terms *eczema* and *dermatitis* are often used interchangeably. Dermatitis simply means inflammation of the skin, whereas eczema has no universally agreed definition, but in some countries, it indicates a more acute condition. In this section, for consistency, the term *dermatitis* will be used. Many authorities subdivide eczema and dermatitis into exogenous (from an obvious external cause) or endogenous (assumed to be of a genetic cause); however, the distinction is not clear. It is also referred to as acute, generally after a single exposure to an irritant, or chronic, which follows repeated exposure.

Prevalence and epidemiology

The exact prevalence of irritant contact dermatitis (ICD) and allergic contact dermatitis (ACD) is unclear, although ICD is much

Table 9.33
Practical prescribing: Summary of medicines for cold sores

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Aciclovir	Yes, but no lower age stated	Stinging	None	None	OK
Zinc and lidocaine (Lypsyl Cold Sore Gel)	Older than 12 years				
Ammonia and phenol (Blistex Relief Cream)	Yes, but no lower age stated	None			
Urea (Cymex)					

more common than ACD and has been reported to account for 80% to 90% of all occupational skin disorders. ACD is said to affect 1% to 2% of the population with certain patient groups, such as patients with leg ulcers, at a higher risk of developing ACD.

Aetiology

Different physiological mechanisms are responsible for ICD and ACD. In ICD, an agent must penetrate the outer layer of skin, the stratum corneum, to provoke a physiological response. The type of irritant, concentration, quantity involved and length of exposure all affect the severity of reaction. This can occur with a single exposure or more commonly with frequent exposures when the irritant accumulates in the stratum corneum. For example, strong acids and alkaline substances can produce ulceration on a single exposure, whereas other agents (e.g., zinc oxide tape) potentially require multiple exposures and tend to provoke a weaker reaction and cause a prickly heat type of dermatitis.

ACD first requires sensitization to occur. This leads to specific cell-mediated sensitization. After the skin has become sensitized to an allergen, reexposure to the allergen triggers memory T cells to initiate an inflammatory response 24 to 48 hours after reexposure. Because these T cells are distributed throughout the body, this explains why lesions are seen away from the site of exposure. The risk of sensitization can depend on the individual's susceptibility as well as the allergen's concentration and quantity. Reexposure can occur days and sometimes years after initial exposure. Common irritants and allergens are listed in Table 9.34.

Arriving at a differential diagnosis

Determining an accurate diagnosis can be difficult because clinical features of similar conditions overlap (Table 9.35). Asking symptom-specific questions helps to establish a differential diagnosis (Table 9.36).

Table 9.34
Irritants and allergens known to precipitate dermatitis

Irritants that can precipitate irritant contact dermatitis	Allergens that can precipitate allergic contact dermatitis
Detergents and soaps	- Nickel (especially in jewellery) - Chromate in cement
Solvents and abrasives	- Topical corticosteroids (5% of patients)
Oils	- Cosmetics, particularly fragrances, hair dyes, preservatives and nail varnish resin
Acids and alkalis, including cement	- Rubber, including latex
Reducing agents and oxidizing agents	- Dyes, formaldehyde and epoxy resins

Table 9.35
Causes of dermatitis-like rash and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	- Irritant contact dermatitis
Likely	- Allergic contact dermatitis - Atopic dermatitis - Cellulitis - Chickenpox or shingles - Urticaria - Psoriasis
Unlikely	- Discoid dermatitis - Fixed drug eruption - Fungal infection - Lichen planus - Scabies
Very unlikely	- Lupus erythematosus

Table 9.36
Specific questions to ask the patient: Dermatitis

Question	Relevance
Location	- The distribution of rash for contact dermatitis is closely associated with clothing and jewellery (Fig. 9.43).
Level of itch	- Mild itch is associated with conditions such as psoriasis and medicine eruptions. - Moderate to severe itch is associated with scabies and atopic and contact dermatitis.
Occupational exposure	- A history of when the rash occurs gives a useful indication as to the cause (e.g., a construction worker might complain of sore hands while at work, but when on holiday, the condition improves, only for it to worsen when he or she goes back to work).

Clinical features of irritant contact dermatitis and allergic contact dermatitis

All forms of dermatitis cause redness, drying of the skin, irritation and pruritus to varying degrees and might show papules and vesicles. Itching is a prominent feature and often causes the patient to scratch, which results in broken skin with subsequent weeping. In chronic exposure, the skin becomes dry and scaly and can crack and fissure (Fig. 9.44). In both cases, rash develops at the site of

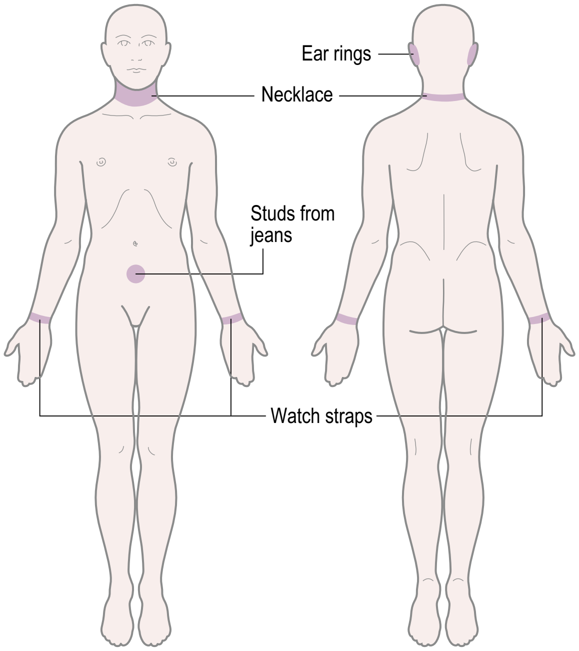

Fig. 9.43 Distribution of contact dermatitis.

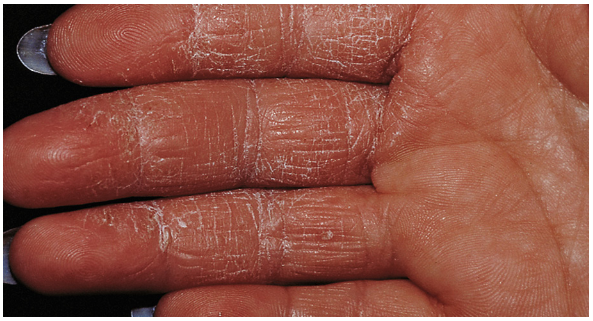

Fig. 9.44 Irritant dermatitis. (From White, G. [2004]. *Color atlas of dermatology* [3rd ed.]. Churchill Livingstone.)

exposure. In the acute phase, lesions tend to appear rapidly, within 6 to 12 hours of contact, although this can be up to 72 hours in ACD. The rash in ICD tends to be well demarcated. In ACD, the rash tends to be less well defined with milder involvement away from the site of exposure seen on repeated exposure. It is estimated that 75% of all cases of contact dermatitis and 80% to 90% of occupational dermatitis involve the hands.

Conditions to eliminate

Likely causes

Atopic dermatitis

Although this is more associated with children, it can affect any age group. The presence of itch is a key symptom. Location of rash varies with age: in children, flexures are often affected, but in adults, hand involvement is common. Differences between ICD or ACD and atopic dermatitis tends to be personal history of dry skin and allergy (e.g., asthma or hayfever).

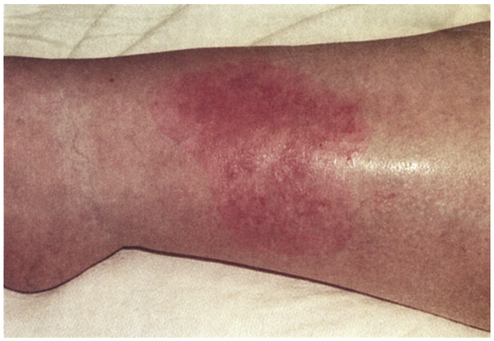

Fig. 9.45 Cellulitis. (*Medical assistant: Integumentary, sensory systems, patient care and communication—Module A.*)

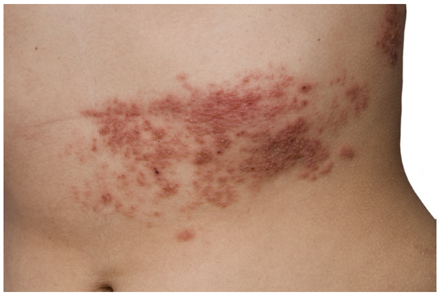

Fig. 9.46 Shingles. (From [2018]. *Building a medical vocabulary: With Spanish translations* [10th ed.].)

Cellulitis

Characterized by erythema rash that tends to be painful, hot and swollen rather than having prominent itch. It also can exhibit systemic symptoms (Fig. 9.45). The location is often lower limb, which is not a common site for ICD or ACD.

Chickenpox or shingles

Chickenpox is associated with vesicular itching rash and may mimic dermatitis. However, prodromal symptoms that could include fever, headache and sore throat are common. Chickenpox also has a classically distribution of affecting the face first before spreading to the trunk and extremities. In shingles, prodromal symptoms of localized pain or burning may be experienced before the rash appears. The chest, lumbar region and face are most affected sites. The rash is unilateral, itchy or painful and begins as papules before blistering (Fig. 9.46). If shingles is the diagnosis, then a 7-day course of an antiviral (e.g., aciclovir 800 mg five times a day) can be given under a patient group direction such as Pharmacy First. See Case study 9.3 for differentiation of shingles from other conditions.

Psoriasis

Isolated lesions of psoriasis can be superficially similar to dermatitis; they appear red and scaly, although a key difference is the lack of prominent itch in psoriasis. The distribution of lesions is also usually different, and psoriasis is not precipitated by exposure to certain irritants or allergens.

Table 9.37
Food additives known to cause allergic reaction

Additive	Uses
Sulphites (E220–E227)	Sulphites are used to preserve smoked and processed meats, dried fruit (apricots) and salads. They are commonly found in liquid form in cold drinks, fruit juice concentrates and wine and are sprayed onto foods to keep them fresh and prevent discolouration or browning.
Benzoic acid and parabens (E210–E219)	Benzoates and parabens have antibacterial and antifungal properties for prevention of food spoilage. These agents are added to pharmaceutical and food products and occur naturally in prunes, cinnamon, tea and berries.
Antioxidants (E320–E321)	Fat and oils in food turn rancid when exposed to air. Synthetic phenolic antioxidants, butylated hydroxyanisole and butylated hydroxytoluene prevent this spoilage from happening but can trigger asthma, rhinitis and urticaria.
Flavour enhancers (E620–E635)	These are used to enhance food palatability, most notably aspartame, which can trigger urticaria and swelling, and monosodium glutamate (E620), which can trigger the so-called Chinese restaurant syndrome of headache and burning plus tightness in the chest, neck and face.
Colourings (E100–E190)	Colourings are used to make food visually more attractive; the azo dyes (Tartrazine, E102, Sunset Yellow, E110) and nonazo dyes (erythrosine) have been associated with triggering urticaria, asthma and generalized allergic reactions.

Urticaria

Urticarial rashes can have many causes, most notably medicines, food allergies and food additives (Table 9.37). Like dermatitis, the rash is itchy and red but resembles the rash seen when stung by a stinging nettle (Fig. 9.47). Weals can be red or white, itch and be surrounded by an area of redness. The rash appears suddenly and tends to fade and disappear after 24 hours. In addition, the skin can be oedematous and blanches when pressed. Urticarial reactions often respond well to systemic antihistamines.

Unlikely causes

Discoid dermatitis

This differs from other forms of dermatitis because the lesions have clearly demarcated edges and are circular or oval. Lesions tend to affect the arms and legs and are often distributed symmetrically. It is more common in middle-aged people.

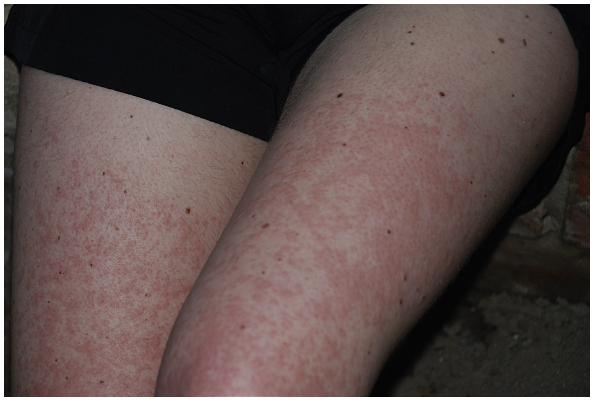

Fig. 9.47 Urticarial reaction to grass.

Fixed drug eruption

This typically presents as a single or small number of well-defined circular patches that may blister and over time become scaly. Itch is often present. The hands and face are common locations. Typically, a medication history reveals causality.

Fungal infection

Fungal infections exhibit the typical dermatitis-type symptoms of itchy red rash and can therefore be confused. Very clear lesion demarcations along with differing locations and central clearing point towards fungal infection.

Lichen planus

Lesions can look like dermatitis but tend to show white steaks on the surface, and itch is mild or absent (see Fig. 9.6).

Scabies

Scabies presents with itch, which is often generalized with the rash mainly affecting the hands and therefore can present like hand dermatitis. Papules and vesicles tend to be more prominent in scabies (see Fig. 9.37).

Very unlikely causes

Lupus erythematosus

Generalized eruptions may appear on the trunk, limbs, and face. Lesions are red, annular and scaly. Itch can be present. Sun exposure and medication can trigger symptoms.

Fig. 9.48 will aid the differentiation of dermatitis.

Red flags indicative of referral: Dermatitis

Reason for referral	Why referring	Timeframe for referral
Rash associated with recent medicine use	Suggests drug eruption or lupus	As soon as practicable
Systemic symptoms	Suggests infection such as cellulitis	

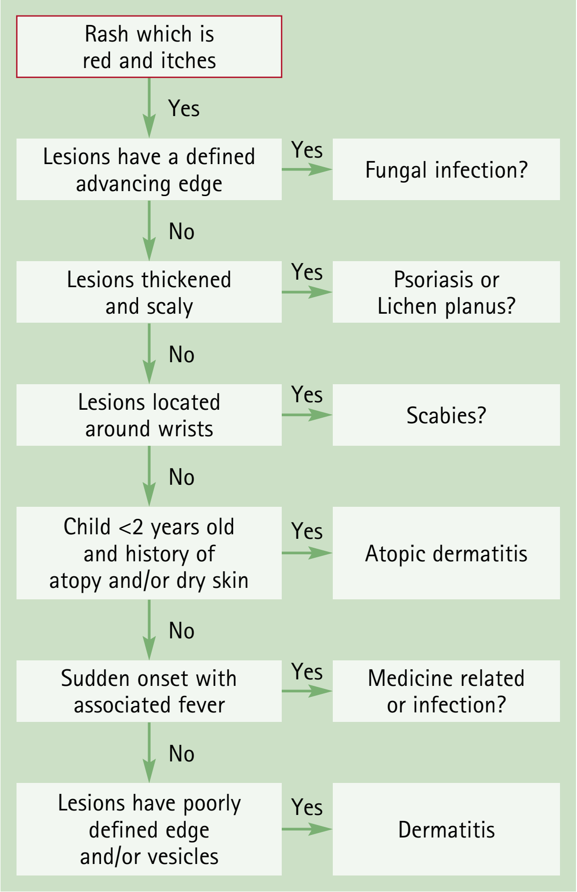
Rash which is red and itches
Yes
Lesions have a defined advancing edge
Yes
Fungal infection?
No
Lesions thickened and scaly
Yes
Psoriasis or Lichen planus?
No
Lesions located around wrists
Yes
Scabies?
No
Child <2 years old and history of atopy and/or dry skin
Yes
Atopic dermatitis
No
Sudden onset with associated fever
Yes
Medicine related or infection?
No
Lesions have poorly defined edge and/or vesicles
Yes
Dermatitis

Fig. 9.48 Primer for the differential diagnosis of dermatitis.

Evidence base for over-the-counter medication

Treatment should include avoiding irritants, managing the itch and maintaining skin integrity. Nonpharmacologic interventions include avoidance of the causative agent, although this is sometimes impractical. Sweating intensifies the itching, so strategies to keep the person cool will help; cotton and loose-fitting clothing can be worn.

Pharmacologic treatment of patients with dermatitis should be managed with a combination of emollients and steroid-based products.

Emollients

Emollients should be used on a regular basis to keep the condition under control, with flare-ups treated with corticosteroids.

Choosing the most efficacious emollient for an individual is difficult because of the lack of comparative trial data between products and the variable nature of patients' responses. In general, patients respond to a thicker emollient rather than an elegant cosmetic brand because these allow greater retention of water (e.g., 50% liquid paraffin and 50% white soft paraffin). However, patient acceptability of such products needs to be considered. Cream formulations rather than ointments tend to be more readily accepted by patients because they are easier and less messy to use. In general, the dryer the skin, the more likely an ointment is needed. If the skin is broken or weeping, a water-soluble cream can be useful. To avoid the drying effects of soap, a soap substitute should be used.

Steroids

In the United Kingdom, hydrocortisone (classified as mild potency) and clobetasone (moderately potent) are available. Both have proven efficacy in treating dermatitis and should be considered first-line treatment for patients with acute dermatitis. The choice between hydrocortisone and clobetasone is based on the severity of the dermatitis and the site of the dermatitis, with hydrocortisone being best for areas that have thin skin (e.g., flexures) and clobetasone possibly better for other areas (e.g., hands and palms) or when hydrocortisone has failed to control symptoms.

Practical prescribing and product selection

Prescribing information relating to specific products used to treat dermatitis is summarised in Table 9.38; useful tips relating to using products to treat dermatitis are given in the 'Hints and tips' in Box 9.8.

Emollients

A large number of emollients are on the market. They come in a range of formulations to suit all skin types and patient preference. Patients should be instructed to apply emollients liberally and whenever needed. They are pharmacologically inactive and so can be used by all patients regardless of age or medical status. A number of ingredients incorporated into emollients do have the potential to sensitize the skin, and patients should be advised to carry out a patch test with the product on the back of the hand before starting to use it routinely.

Table 9.38
Practical prescribing: Summary of medicines for dermatitis

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Emollients	From birth onwards	None	None	None	OK
Corticosteroids					
Hydrocortisone	Older than 10 years	None	None	None	OK
Clobetasone	Older than 12 years				

HINTS AND TIPS BOX 9.8: DERMATITIS

Patch testing for allergies	• If the rash persists despite avoiding likely irritants and allergens, patch testing could be tried.
Fingertip units	• Patients should be instructed to use a fingertip unit. This is the distance from the tip of the adult index finger to the first crease. This unit measurement is especially useful for the application of steroids. In adults: • One hand: Apply 1 fingertip unit. • One arm: Apply 3 fingertip units. • One foot: Apply 2 fingertip units.
Quantity of steroid required	• The BNF gives the following guidance for 1 week's use for an adult if applying twice a day: • Both hands: 15–30 g • Both arms: 30–60 g • Both legs and trunk: 100 g
When to apply emollients and corticosteroids	• After using a corticosteroid, an emollient can be applied to the same area 30 minutes later.

Corticosteroids

Although corticosteroids can be sold to patients OTC, there are a number of restrictions on their sale. In the United Kingdom, these are as follows:

- The patient must be older than 10 years for hydrocortisone (older than 2 years of age in Australia) and older than 12 years of age for clobetasone.
- The duration of treatment is limited to a maximum of 1 week.
- A maximum of 15 g can be sold at any one time.
- They cannot be used on facial skin, the anogenital region or broken or infected skin.

Hydrocortisone

Hydrocortisone can be bought alone or in combination with other ingredients (e.g., Eurax Hc, Canesten Hydrocortisone). It is prudent to use products solely containing hydrocortisone for dermatitis, applying them twice daily. If secondary infection is suspected; for example, with a fungal infection – products such as Canesten Hydrocortisone can be used.

Clobetasone (Eumovate eczema and dermatitis cream)

Like hydrocortisone, clobetasone should be applied twice a day.

Further reading

Bellingham, C. (2001). Proper use of topical corticosteroids. *The Pharmaceutical Journal*, *267*, 377.

Clark, C., & Hoare, C. (2001). Making the most of emollients. *The Pharmaceutical Journal*, *266*, 277–279.

Websites

National Eczema Association. http://www.nationaleczema.org/
National Eczema Society. http://www.eczema.org/

Sun exposure and melanoma risk

Background

It is now well recognized that excessive or prolonged exposure to the sun's rays and inadequate skin protection can result in precancerous and cancerous neoplasms. Three types of cancer are strongly associated with sun exposure: squamous cell carcinoma (SCC), basal cell carcinoma (BCC) and malignant melanoma (MM) and are responsible for more than 95% of all skin cancers. SCC and BCC result from chronic long-term exposure to sunlight, whereas MM is associated with acute, intense and intermittent blistering sunburns. BCC and SCC are often grouped together as nonmelanoma skin cancer (NMSC).

Prevalence and epidemiology

In the United Kingdom, approximately 100 000 NMSCs and 16 000 cases of melanoma are diagnosed each year. The incidence of melanomas has more than doubled since the 1990s. All skin cancers are most common in older people (older than 75 years), but melanoma is also seen in young adults.

Aetiology

The body's response to the effects of UVA and UVB light is protective. On exposure to UV light, melanocytes increase the production of melanin, thus causing a darkening of the skin (a suntan). Melanin absorbs both UVA and UVB and effectively protects the skin from damage; however, melanin synthesis is slow, and skin damage might well have already occurred, manifesting as sunburn. Sunburn is an inflammatory response to excessive exposure to UV light whereby an increase in inflammatory mediators results in capillary vasodilation and increased capillary permeability. In addition to melanin production, epidermal hyperplasia occurs, causing the skin to thicken, providing further protection.

Arriving at a differential diagnosis

Pharmacists have a major role to play in dealing with patients who have been exposed to excessive amounts of sunlight. They can promote sun safety messages and make appropriate referrals about suspicious lesions. Although NMSC is much more common than MM, this section focuses on the differentiation of melanoma from other lesions because melanoma has the highest mortality rates, but if detected early, it has a very high (90%) 5-year survival rate. Table 9.39 identifies other types of pigmented lesions that need to be differentiated from melanomas.

Table 9.39
Causes of suspect cancerous lesions and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	Benign common mole Freckles
Likely	Actinic keratosis Atypical mole Lentigines Seborrhoeic keratoses
Unlikely	Angioma or haemangioma Angiokeratoma Dermatofibroma
Very unlikely	Kaposi sarcoma Melanoma

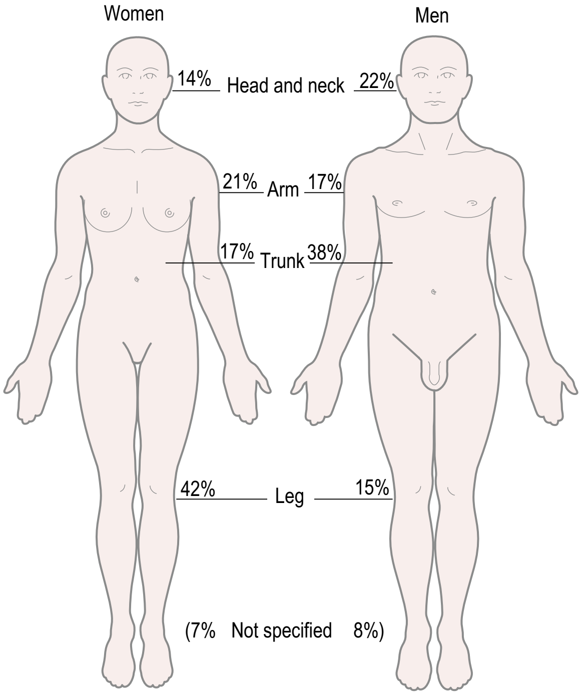

Fig. 9.49 Distribution of malignant melanoma.

Clinical features of malignant melanoma

There are four common subtypes—superficial spreading melanoma (80% of cases), nodular melanoma, lentigo maligna melanoma and acral lentiginous melanoma—although the latter subtype is rare. It can appear on all body sites, yet distribution between males and females does differ (Fig. 9.49). In the UK population, the most common sites are the lower leg in females and the trunk in males. Risk factors include early childhood sun exposure, people with multiple moles, a family history of melanoma and advancing age. The first sign of melanoma is often a change in the size, shape or colour of a mole, although melanoma can also appear on the body as a new mole (Fig. 9.50). Early identification is essential; two commonly used checklists are used to aid diagnosis, the seven-point checklist and the ABCDE list, although NICE advocates the use of the seven-point checklist.

The seven-point checklist

This checklist consists of three major and four minor changes. Major changes are awarded 2 points and 1 point for minor changes. Any lesion should be suspected as MM with a score of 3 or more. Major and minor changes are shown below:

Major (scores 2)

1. Change in shape
2. Change in size
3. Change in colour

Minor (scores 1)

1. Largest diameter 7 mm or more
2. Inflammation
3. Oozing
4. Change in sensation (e.g., itch or irritation)

The ABCDE rule

This checklist consists of five points:

- **Asymmetry.** Ordinary moles are usually symmetrical in shape. Melanomas are likely to be irregular or asymmetrical.
- **Border.** Moles usually have well-defined, regular borders. Melanomas are more likely to have irregular borders with jagged edges.
- **Colour.** Moles are usually uniform brown. Melanomas tend to have more than one colour. They may be varying shades of brown mixed with black, red, pink, white or a bluish tint.
- **Diameter.** Moles are normally no bigger than the blunt end of a pencil (~6 mm across). Melanomas are usually more than 7 mm in diameter.
- **Evolution.** The symmetry, border, colour or diameter of a mole has changed over time.

Conditions to eliminate

Most likely

Benign common mole

These tend to appear shortly after birth until early adulthood. They occur anywhere on the body and tend to be round or oval and symmetrical with smooth and well-demarcated borders and have an even colour of pink, tan or brown. Light-skinned individuals tend to have light-coloured moles, and dark-skinned individuals tend to have dark brown or black moles. Sizes range from a couple of millimetres to several centimetres, but usually they are less than 6 mm in diameter. Benign moles tend to have an overall similar appearance, whereas an outlier with a different appearance is more likely to be undergoing malignant change, the 'ugly duckling' concept.

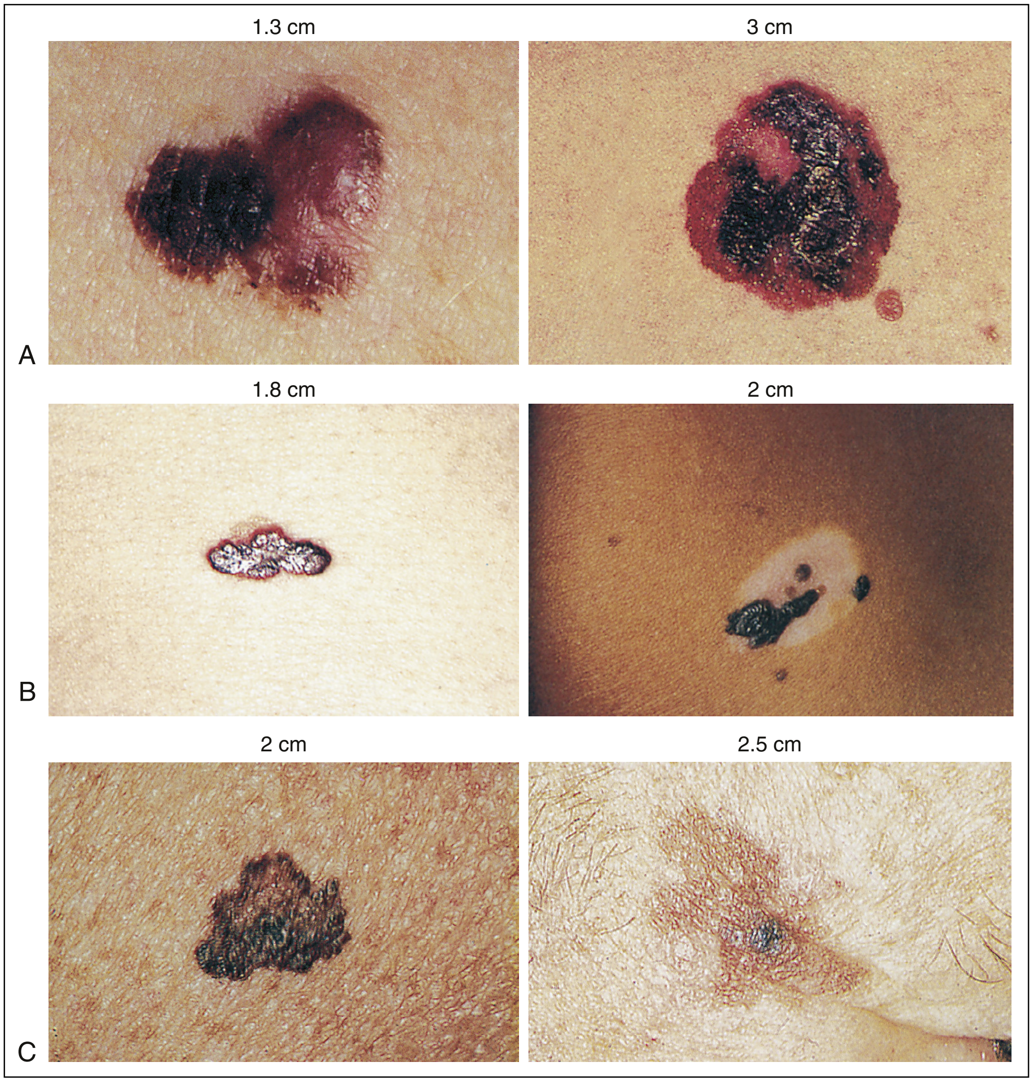

Fig. 9.50 Superficial spreading melanoma, irregular in colour and shape (A–C). (From Shiland, B. J. [2023]. *Mastering healthcare terminology* [7th ed.]. Mosby.)

Freckles

These are flat poorly defined macules usually less than 1 cm in diameter that vary in colour from light to dark brown. They become more numerous through exposure to sunlight. People with fair complexions are most likely to experience freckles.

Likely causes

Actinic keratosis

Actinic keratosis is the most common premalignant skin condition, with approximately 1 in 1000 cases progressing to SCC. Lesions occur on parts of the body that are exposed to long-term sun exposure (e.g., head, forearms, hands). They begin as small rough spots. Roughness is a key feature, often referred to as feeling like rubbing sandpaper. They are generally flat and brown and have well-demarcated edges. Symptoms of actinic keratosis include tenderness, itchiness and burning. Over a period of years, they enlarge and often become red and scaly.

Atypical mole

Atypical moles are benign pigmented lesions that look different from a common mole and exhibit some clinical features that suggest malignant melanoma. They are usually bigger, characterized by a size larger than 5 mm in diameter, and can show irregular shape, indistinct borders and variable colours, often showing a mixture of several colours, from pink to dark brown. They tend to be flat, with a smooth, slightly scaly or pebbly surface. A number of types have been described: a halo naevus is surrounded by a depigmented halo of normal skin and is common in older children and young teenagers. A Spitz naevus is a firm, round, pink, red or reddish-brown nodule of less than 2 cm in diameter. It usually occurs on the face or legs. A blue naevus is a raised smooth lesion which is blue or blue-black in colour that are less than 1 cm in diameter that occur anywhere but are common on the face. A congenital naevus (birthmarks) presents from or shortly after birth and is usually larger than acquired naevi and are dark brown or black in colour.

Lentigines (age spots)

These vary in size, but most are less than 5 mm in diameter and appear as flat brown-black sometimes irregular shaped lesions. They can look like freckles but tend to be darker and do not fade in the winter. There are number of types of lentigo, with solar lentigo (ager spots or liver spots) being most common and result from chronic sun exposure and occur from middle age onward. Ink-spot lentigo can cause confusion with melanoma because they are very dark or black and may have an irregular border.

Nonmelanoma skin cancer

Both cancers commonly occur on skin surfaces, such as the hands, face and scalp. SCC initially presents as raised lesions that exhibit a horny or scaly appearance that later become nonhealing lesions often larger than 1 cm, which can ulcerate. BCC starts as a small translucent papule with a rolled edge and obvious telangiectasia over the surface. Over time (growth can be very slow), the size of the papule increases, and it can ulcerate and crust over.

Seborrhoeic keratosis

Seborrhoeic keratoses (also known as seborrhoeic warts or basal cell papillomas) are benign flat or raised lesions that vary in colour. Initially, they take on the colour of the person's skin but gradually darken. They range in colour from light brown to jet black and have a stuck-on appearance (see Fig. 9.34). They can occur anywhere but are more usual on the trunk and increase in incidence from 40 years onwards. Over time, they can become wartlike. Occasionally, they can become inflamed, itchy or bleed, but this is normally because they have been caught on clothing.

Unlikely

Angioma or haemangioma

These are benign vascular skin lesions that can appear at any time in life, although the most common type of angioma, the cherry angioma, is more common with increasing age. They tend to be less than 1 cm in diameter, appear as firm red to purple papules and can be over any part of the body but are rare on the hands and feet.

Angiokeratoma

These present as an asymptomatic blue-red hyperkeratotic papule anywhere on the skin that are usually smaller than 5 mm in diameter. The surface is variable in nature, but they tend to become warty over time.

Dermatofibroma

Dermatofibromas are benign firm, flesh-coloured nodules that are usually found on the lower legs in adults. The nodule can be brown and have a history of fairly rapid enlargement, which may suggest melanoma.

Very unlikely cause

Kaposi sarcoma

This is associated with human immunodeficiency virus (HIV) infection. Lesions can appear anywhere, tend to be multiple and are generally dark-coloured macules that develop into nodules or plaques. Common locations for lesions are the feet, legs and face.

Red flags indicative of referral: Suspect skin lesions

Reason for referral	Why referring	Timeframe for referral
• Lesions on sun exposed areas, especially in people older than 70 years	• Suggests actinic keratosis or NMSC	• As soon as practicable
• Appearance of new moles that are >5 mm or have an irregular border	• Suggests atypical mole or age spots but melanoma needs ruling out	
• Lesions that have become itchy or irritated or are prone to bleeding • Moles that have changed in size, shape or colour	• Suggests potential melanoma	• Same-day referral

Evidence base for over-the-counter medication

Avoidance measures

The most effective strategy for preventing skin damage and sunburn and reducing the chance of developing cancers is avoidance of UV light. Various campaigns have been run that promote safe sun messages, for example, SMART and Slip! Slop! Slap! Seek! Slide!

SMART	Slip! Slop! Slap! Seek! Slide!
S: Spend time in the shade between 11 AM and 3 PM.	**Slip** on sun-protective clothing that covers as much of your body as possible.
M: Make sure you never burn.	**Slop** on an SPF 30 + broad-spectrum sunscreen liberally to dry skin at least 20 minutes before sun exposure. Reapply every 2 hours when outdoors.
A: Aim to cover up with a T-shirt, hat and sunglasses.	**Slap** on a broad-brimmed hat that shades your face, neck, and ears.
R: Remember to take extra care with children.	**Seek** shade, particularly between the hours of 10 AM and 2 PM (and 11 AM and 3 PM during daylight saving time).
T: Then use factor 15 + sunscreen and four stars.	**Slide** on sunglasses.

Sunscreens

Although sunscreens play an important role in sunburn protection, they should never replace minimizing sun exposure. Sunscreens use the sun protection factor (SPF) system to indicate the level of protection against UV radiation. It is a measure of the protection from UVB radiation. It is important that people do not assume a linear increase in protection as the SPF increases. For example, a sunscreen with an SPF of 15 blocks 93% of UVB, whereas a doubling to SPF 30 only increases protection by 4% to 97%.

In the United Kingdom, a star rating also exists to indicate the level of protection offered against UVA relative to protection against UVB. A five-star rating indicates that the product has a balanced amount of UVA and UVB protection. The lower the star rating, the greater the protection offered against UVB compared with UVA. Ideally, a product should have a minimum four-star rating.

Practical prescribing and product selection

Prescribing information relating to sunscreen products is discussed and summarised in Table 9.40; useful tips relating to sun protection and sunburn are given in the ‘Hints and tips’ in Box 9.9.

Sunscreens should be applied 15 to 30 minutes before exposure to the sun. It is advocated that all people should use a sunscreen with an SPF of 30 with a four- or five-star rating.

Chemical sunscreens

Chemical sunscreens work by absorbing UV energy and give protection against UVA or UVB, although they tend to be more effective against UVB radiation. Most marketed products contain a combination of agents, including benzophenones, cinnamates, dibenzoylmethanes and *para*-aminobenzoic acid. The latter is now infrequently used because *para*-aminobenzoic acid was frequently associated with contact sensitivity.

Physical sunscreens

Physical sunscreens are opaque reflective agents and offer protection against UVA and UVB radiation. Examples of physical sunscreens include zinc and titanium oxide.

Table 9.40
Practical prescribing: Summary of sun protection products

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Chemical sunscreens	Infants and older	Allergic reactions but may be linked to the vehicle and not the active ingredients	None	None	OK
Physical sunscreens		None but may be cosmetically unacceptable			

HINTS AND TIPS BOX 9.9: SUN-RELATED SKIN PROBLEMS

Water-resistant sunscreens	• These are claimed to be effective after immersion in water. However, studies have shown that sunscreen effectiveness decreases after water exposure. Reapplication should be done after swimming.
Eye protection	• Prolonged (over years) sun exposure can contribute to age-related macular degeneration. Therefore, wraparound sunglasses and lenses that effectively filter UV light should be worn.
Sun protection and vitamin D deficiency	• The UK Department of Health issued guidance to healthcare professionals on the danger of vitamin D deficiency. This, in part, has been caused using sunscreens. Guidance is not to stop using sunscreen, but certain patient groups should take supplements. • https://www.nice.org.uk/guidance/ph56
Medicine-induced photosensitivity	• NSAIDs, tetracyclines, chlorpromazine, phenothiazines and amiodarone can cause pruritus and skin rash when the skin is exposed to natural sunlight, primarily because of UVA radiation. Patients on photosensitive drugs should use a broad-spectrum sunscreen because these filter both UVA and UVB radiation. Reactions are seen usually within hours of taking the medicine.
Treatment of sunburn	• Mild sunburn can be managed with a combination of topical cooling preparations, such as calamine, moisturizers and systemic analgesia.

Further reading

Gupta, A. K., Paquet, M., Villanueva, E., & Brintnell, W. (2012). Interventions for actinic keratoses. *Cochrane Database System Review, 12*, CD004415.

Websites

Charities

Cancer Research UK. https://www.cancerresearchuk.org/home
Melanoma UK. https://www.melanomauk.org.uk/
The Skin Cancer Foundation. https://www.skincancer.org/

Guidance

Concise guidelines on 'The prevention, diagnosis, referral and management of melanoma of the skin', 2007. https://cdn.bad.org.uk/uploads/2021/12/29200150/RCP-Melanoma-Guidelines-2007.pdf
National Institute for Health and Care Excellence (NICE). Guidance on skin cancer protection. https://www.nice.org.uk/guidance/ph32

General sites

Sunsmart website. https://www.sunsmart.com.au/
Melanoma Research Foundation. https://melanoma.org/

Bites and stings

Background

A whole host of animals (and plants) have the capacity to cause injury to the skin, and depending on the severity, this can result in systemic symptoms. Most cases in the United Kingdom are caused by insects and are of nuisance value.

Prevalence and epidemiology

The prevalence of bites and stings is largely unknown. Most people self-treat and never seek advice. Biting and stinging insects are generally more common in warmer climates and during warmer months.

Aetiology

Stinging insects are broadly defined as those that use some sort of venom as a defence mechanism or to immobilize their prey. Examples include bees, wasps and ants. The venom is usually 'injected' using a stinger and includes proteins and substances that help to break down cells and increase the penetration of the venom (e.g., phospholipase A and hyaluronidase). People can develop allergic reactions to these substances and, unlike with most biting insects, can occasionally have significant reactions, including anaphylaxis. The severity of the reaction depends on the quantity of the venom injected and the person's predisposition to hypersensitivity.

Biting insects are those that feed off the blood supply of humans and other creatures. They include mosquitoes, ticks and fleas. Apart from having some sort of apparatus to draw the blood, these insects usually secrete anticoagulant-like substances to facilitate feeding. It is these anticoagulant substances that people will react to. However, it is only after repeated bites that sensitivity occurs. Some insects (e.g., horseflies, midges) do not have specialized mouthparts and take blood by biting a hole through the skin. These bites are typically more painful.

In the United Kingdom, the most common plant that causes skin reactions is the stinging nettle. An urticarial-type reaction occurs as hairs on the leaf pierce the skin, releasing histamine, acetylcholine and serotonin (see Fig. 9.47).

Arriving at a differential diagnosis

The diagnosis should be straightforward because the patient should remember being bitten or stung. However, a number of other conditions should be considered (Table 9.41).

Clinical features of bites and stings

Itching papules, which can be intense, are the hallmark symptom of insect bites. Weals, bullae and pain can occur, especially in sensitized individuals. Lesions are often localized and grouped together, and they occur on exposed areas, for example, the hands, ankles and face (Fig. 9.51). Scratching can cause excoriation, which might lead to secondary infection. In contrast, stings are associated with intense burning pain. Erythema and oedema follow but usually subside within a few hours. If systemic symptoms are experienced, they occur within minutes of the sting.

Table 9.41
Causes of lesions that may present like insect bites and the likelihood of presentation in community pharmacy

Incidence	Cause
Likely	• Contact dermatitis • Urticaria
Unlikely	• Chickenpox • Scabies
Very unlikely	• Lyme disease

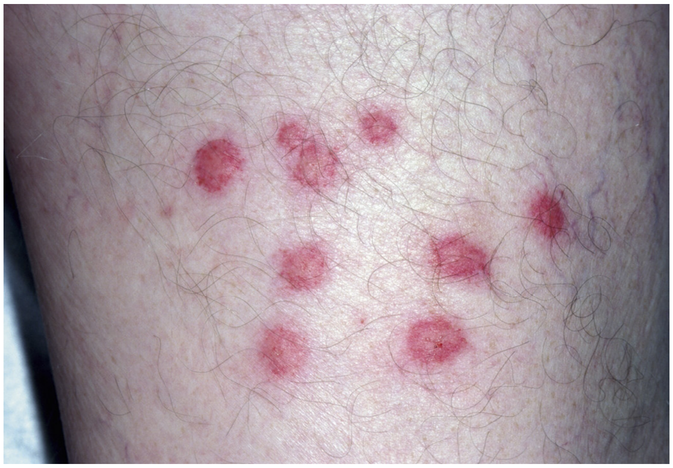

Fig. 9.51 Insect bites. (From Micheletti, R. G., James, W. D., Elston, D. M., & McMahon, P. J. [2023]. *Andrews' diseases of the skin: Clinical atlas* [2nd ed.]. Elsevier.)

Conditions to eliminate

Likely causes

Contact dermatitis

Acute presentations are characterized by red itching rash that may show papules and vesicles. A recent history of exposure to an irritant or allergen is usual, which is often related to occupation.

Urticaria

Urticarial rashes have an acute onset and itch. The rash itself tends to be more macular than vesicular and blanches when pressed. They are often precipitated by medicines and allergic reactions to food stuffs.

Unlikely causes

Chicken pox

Chickenpox presents with a vesicular itchy rash. Vesicles appear in crops that burst and crust over that could superficially look like insect bites, especially those seen on the face. However, chickenpox lesions spread to the trunk and extremities after facial involvement. Prodromal symptoms may also be present.

Scabies

Scabies presents with rash that exhibits papules and vesicles on the hand and can resemble insect bites. Itch in scabies is usually intense, generalized and worse at night, which distinguish it from insect bites.

Very unlikely causes

Lyme disease

Ticks can be picked up when walking in open grassy areas. If a tick is found on the body, it will need removal. Ticks should be removed with fine tweezers by gripping the insect close to the skin and pulling straight up. Twisting movements should be avoided because they increase the chance that mouthparts will be left in the skin. A small proportion of ticks carry a spirochete bacterium that can lead to the person's developing Lyme disease. If a person develops a spreading red-purple flat rash with a defined border with a history of a tick bite (even months previously), then Lyme disease should be considered. As the rash spreads, it develops a characteristic 'bulls eye' appearance (Fig. 9.52). Other symptoms include flulike symptoms, such as fatigue, fever and headache. Lyme disease most commonly occurs on the south coast of England, the Lake District and the Scottish Highlands.

Red flags indicative of referral: Insect bites

Reason for referral	Why referring	Timeframe for referral
• Lesions with a 'bull's eye' appearance	• Suggests Lyme disease	• Same-day referral
• Intense itching	• Suggests scabies	

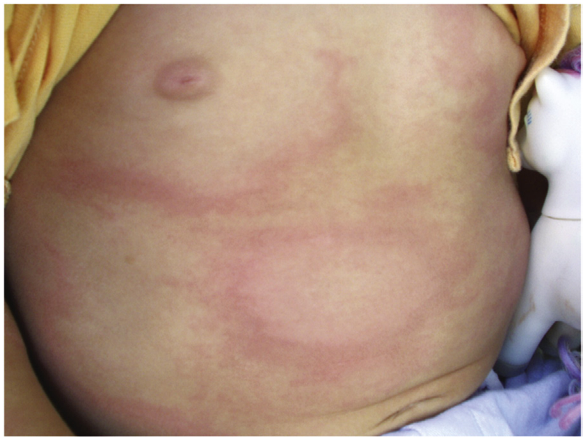

Fig. 9.52 Lyme's disease. (From Kliegman, R., Geme, J. W., St., Blum, N. J., Schuh, A. M., & Tasker, R. C. [2025]. *Nelson textbook of pediatrics* [22nd ed.]. Elsevier.)

Evidence base for over-the-counter medication

Avoiding being bitten or stung in the first place is obviously important. DEET is the most effective insect repellent and is found in most commercial preparations. For avoidance measures and more information on DEET, see the section on malaria in Chapter 13.

Topical OTC treatments for bites and stings include local anaesthetics, corticosteroids and antihistamines. However, there is a lack of evidence for the efficacy of these treatments, and in general, recommendations for treatment are based on expert opinion and clinical experience.

Antihistamines have been used for their antipruritic properties. Some studies with systemic antihistamines have shown efficacy of the less sedating antihistamines for mosquito bites (Foëx & Lee, 2006). Sedating antihistamines are probably most useful to combat itching that can disturb sleep.

Practical prescribing and product selection

Prescribing information relating to products for bites and stings is reviewed in the section 'Evidence base for over-the-counter medication' and summarised in Table 9.42. Before OTC treatment is offered, the severity of symptoms should be assessed because small local reactions can be managed primarily with topical products, whereas large local reactions generally require systemic treatment.

If the person has been stung and the stinger is still in situ, then this should be removed. The best way of removal is to scrape the stinger away with a sharp edge (e.g., card or knife blade) or alternatively a fingernail.

Small local reactions

Local pain and swelling are best treated with cold compresses or ice and, if needed, oral pain killers (ibuprofen or paracetamol). Local itching can be treated with topical crotamiton or low-potency corticosteroids (hydrocortisone 1%). If itching interferes with sleep, then an oral sedating antihistamine might be helpful at night.

Table 9.42
Practical prescribing: Summary of medicines used for insect bites and stings

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in which care is exercised	Pregnancy and breastfeeding
Benzocaine	Older than 12 years	Can cause sensitization reactions	None	None	OK
Lidocaine					
Hydrocortisone	Older than 10 years	None			
Crotamiton	Older than 3 years				
Chlorphenamine	Older than 1 year	Dry mouth, sedation, dizziness, headache, nausea and constipation	Increased sedation with alcohol, opioid analgesics, anxiolytics, hypnotics and antidepressants	Glaucoma, prostate enlargement	Standard references state OK, although some manufacturers advise avoidance

Large local reactions

Occasionally, severe pain and swelling can extend beyond the immediate surroundings of the lesion. They should be managed with oral pain killers and antihistamines.

Local anaesthetics (e.g., benzocaine [Lanacane], lidocaine [Savlon Bites and Stings Pain Relief Gel])

Local anaesthetics can be used in adults and children older than the age of 12 years and are in general applied three times a day. They are safe to use in pregnancy and are generally well tolerated. Local anaesthetics are known to be skin sensitizers and can produce contact dermatitis.

Hydrocortisone

Hydrocortisone is applied once or twice a day to the affected areas. It can be used in adults and children older than 10 years of age. It can be used for a maximum of 7 days.

Sedating antihistamines (e.g., chlorphenamine)

As well as causing sedation, they also possess anticholinergic side effects, which commonly result in dry mouth and possibly constipation. It is these anticholinergic properties that mean patients with glaucoma and prostate enlargement should ideally avoid their use because it could lead to increased intraocular pressure and precipitation of urinary retention. They interact with other sedating medication, resulting in potentiation of the sedative properties of the interacting medicines.

Chlorphenamine (e.g., Piriton)

Chlorphenamine can be given from the age of 1 year. Children up to the age 2 years should take 2.5 mL of syrup (1 mg) twice a day. For children aged between 2 and 5 years, the dosage is 2.5 mL (1 mg) three or four times a day, and for those older than the age of 6 years, the dosage is 5 mL (2 mg) three or four times a day. Adults should take 4 mg (one tablet) three or four times a day.

Crotamiton (Eurax)

Adults and children older than 3 years of age should apply crotamiton two or three times a day. A combination product containing hydrocortisone is also available (Eurax HC).

References

Foëx, B. A., & Lee, C. (2006). Oral antihistamines for insect bites. *Emergency Medicine Journal, 23*, 721–722.

Further reading

Anon. (2012). Management of simple insect bites: Where's the evidence? *DTB, 50*, 45–49.
Kennedy, J. (2011). Self-care of insect bites and stings. *SelfCare, 2*, 111–114.

Website

Lyme Disease Action. https://www.lymediseaseaction.org.uk/

Generalized pruritus (without rash)

Background

Generalized itching is a common presentation and can be debilitating, affecting the person's quality of life. It is defined as acute if lasting less than 6 weeks and chronic when lasting for more than 6 weeks. It can be caused by many things, including an underlying internal cause. Internal causes may stem from a metabolic or haematologic cause, endocrine dysfunction or certain forms of cancer.

Prevalence and epidemiology

Although it is accepted that itch is a common symptom, the exact prevalence is poorly understood, although the prevalence does increase with increasing age. In two studies, chronic pruritus was reported as ranging from 8% to 16%.

Aetiology

The mechanisms involved are not fully understood, but it appears to complex and multifactorial and involves histamine and other inflammatory mediators.

Arriving at a differential diagnosis

The diagnosis is not straightforward, and in up to 50% of patients, no identifiable cause can be found, although dry skin is most likely. A number of other dermatologic and internal conditions also need to be considered (Table 9.43). Asking symptom-specific questions helps to establish a differential diagnosis (Table 9.44).

Clinical features of dry skin (xerosis)

Signs and symptoms of dry skin vary among individuals but are characterized by abnormally dry, itchy and scaly skin caused by atrophy of the skin barrier and reduced hydration of the skin. The skin can feel tight and uncomfortable. In moderate to severe cases, the skin can crack and fissure. It can exhibit seasonality and is often worse in the winter. In the older adult population, dry skin is a common cause of pruritus.

Conditions to eliminate

Likely causes

Infection

Several infective causes can present with generalized pruritus as their initial presentation and include hepatitis C, HIV/AIDs, and some local or endemic infections such as Chikungunya fever and river blindness. Substance misuse or sexual history might implicate HIV or hepatitis C infection and foreign travel for endemic infections.

Table 9.43
Causes of generalized pruritus and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Dry skin (xerosis)
Likely	• Infection • Medicines • Scabies

Unlikely	• Aquagenic pruritus
	• Diabetes
	• Haematologic disorders
	  • Iron deficiency
	  • Polycythaemia vera
	• Liver disease
	• Pregnancy
	• Psychological (e.g., anxiety, depression)
	• Sjögren syndrome
	• Thyroid dysfunction

Very unlikely	• Malignancy • Neurologic (e.g., multiple sclerosis) • Renal failure

Medicines

Many medicines can cause itch. Commonly implicated medicines are opioids and antibiotics. Other classes of medicines include ACE inhibitors, calcium channel blockers, selective serotonin reuptake inhibitors, antiepileptics, biologics, statins and chloroquine.

Scabies

Skin lesions can by minimal or absent but present with generalized severe itch.

Table 9.44
Specific questions to ask the patient: Generalized pruritus

Trigger factors	• Stress can cause or aggravate pruritus or may indicate a psychogenic cause. • Hot or dry environments often make xerosis worse.
Timing	• Nocturnal itch may suggest uraemia, cholestasis or psychogenic itch.
Location	• Palms and soles suggest liver disease.
Nature of itch	• Prickling itch provoked by skin cooling after a hot shower or bath suggests aquagenic pruritus. • Crawling itch described as 'like insects crawling over the skin' may be psychogenic in origin. • Burning may suggest lymphoma.
Associated symptoms	• Fatigue suggests anaemia, polycythaemia vera, liver disease, renal failure or malignancy. • Weight changes suggests thyroid dysfunction, renal failure or malignancy. • Excessive sweating suggests polycythaemia vera or malignancy.
When itching started	• After foreign travel may suggest local infection. • After initiation of medicines may suggest an adverse drug reaction.
Household or other contacts	• These suggest scabies infection.

Unlikely causes

Aquagenic pruritus

Patients complain of an intense pricking itch on contact with water or change of skin temperature, but they do not develop a rash. The thighs and upper arms are most affected. It is more common in middle-aged females.

Diabetes

Generalized pruritus is a rare symptom that occurs at the onset of diabetes.

Haematologic disorders

Iron deficiency

Symptoms experienced are associated with the speed at which anaemia develops. Most commonly, patients show fatigue, dyspnoea, headache and restless leg syndrome. Less commonly symptoms include heart palpitations, tinnitus, hair loss and generalized itchiness.

Polycythaemia vera

In approximately 20% to 50% of patients, itch is precipitated by taking a hot bath or shower. This can be used as a 'provocative test". Other symptoms such as headache, dizziness, fatigue, sweating more than usual, blurred vision and dyspnoea predominate. It is more common in older age groups.

Liver disease

Pruritus is a common symptom in several forms of liver disease, although itch is usually secondary to cholestasis. When itch is present, it can be generalized but is typically worse on the palms and soles. Therefore, other signs of liver disease need to be looked for such as jaundice, dark urine, pale faeces, fatigue, spider naevi and nausea.

Pregnancy

This is seen in the last trimester and disappears 2 to 3 days postpartum. Most females have an obvious associated cholestatic jaundice. If jaundice is not present, then liver alkaline phosphatase enzymes are increased.

Psychological (e.g., anxiety or depression)

Some patients describe an intense urge to scratch or pick at the skin without an associated skin disease or other underlying cause, known as functional itch disorder. This has been associated with mental health disorders and worsening stress.

Sjögren syndrome

The two main symptoms are dry eyes and mouth, but other symptoms such as joint pain, cough, fatigue, vaginal dryness and dry skin leading to pruritus can be experienced. It is more common in females and those aged older than 40 years old.

Thyroid dysfunction

Pruritus is a rare manifestation and of little diagnostic value. Unexplained weight changes, heat or cold, sleep issues and gastrointestinal (GI) upset are common presentations.

Very unlikely

Malignancy (e.g., lymphoma, leukaemia, multiple myeloma)

Lymphoma is most strongly associated with pruritus, affecting up to 30% of patients. Unexplained weight loss, night sweats, unexplained fevers, fatigue or lymphadenopathy can be experienced, but pruritus notoriously predates other symptoms by months. Lymphoma, although more common in older people, is one of the cancers seen in younger adults.

Neurologic (e.g., multiple sclerosis)

Multiple sclerosis typically presents before the age of 50 years, but the diagnosis is challenging because of variable presentations. Symptoms include eye pain accompanied by partial or unilateral vision loss, paraesthesia, muscle weakness, urinary symptoms, cognitive dysfunction, mobility problems and fatigue. Pruritus has been reported but is unusual.

Renal failure

Pruritus can be an early feature of renal failure, although few patients present this way. Lethargy, nighttime cramps, weight loss, urine output changes and GI disturbances are seen. In time, more than 50% of patients with chronic renal disease and up to 80% of patients on dialysis have pruritus.

Red flags indicative of referral: Generalized pruritus

Reason for referral	Why referring	Timeframe for referral
• Unexplained weight loss	• Suggests thyroid dysfunction or lymphoma	• As soon as practicable; likely that laboratory tests need to be conducted
• General malaise, decreased urine output	• Suggests renal failure	
• Chronic pruritus in people older than 65 years	• Increased likelihood of an underlying systemic condition	
• Changes in vision	• Possibility of polycythemia vera or multiple sclerosis	
• Fatigue	• Suggests a chronic or sinister pathology	

Evidence base for over-the-counter medication

The use of emollients, steroids and antihistamines to manage itching rashes is well established. When skin itching without rash is observed, emollients are mainstay of treatment with the addition of antihistamines if itch persists.

Practical prescribing and product selection

Self-care measures should be targeted at helping to keep the skin hydrated. Bathing should be limited to short, cool showers using a soap substitute to wash and moisturize the skin, and the patient's home should be humidified, especially during dry, cold winter months. Emollients need to be regularly and liberally applied, potentially with the addition of an active ingredient such as menthol.

Further reading

Reamy, B. V., Bunt, C. W., Usaf, M., & Fletcher, S. A. (2011). Diagnostic Approach to Pruritus. *American Family Physician, 84*, 195–202.

Website

Differential diagnosis of itchy skin. https://dermnetnz.org/topics/differential-diagnosis-of-itchy-skin

Impetigo

Background

Impetigo is a superficial, highly contagious bacterial skin infection affecting the superficial layers of the epidermis. There are two clinical forms; a nonbullous form accounting for about 70% of cases and a bullous form.

Prevalence and epidemiology

Impetigo is most common in young children but can occur at any age.

Aetiology

Impetigo is caused by Staphylococcus aureus and less commonly Streptococcus pyogenes. Infection arises through bacteria gaining entry through a skin break. Transmission to others occurs via direct contact or indirectly via contaminated objects (e.g., towels, clothing). Impetigo usually develops as a primary infection or as a complication from excoriation of the skin if a person has another skin condition such as eczema.

Arriving at a differential diagnosis

Impetigo has a distinctive appearance and should be a relatively straightforward diagnosis, although other conditions need to be considered (Table 9.45). Asking symptom-specific questions helps establish a differential diagnosis (Table 9.46).

Table 9.45
Causes of impetigo-like rash and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	Impetigo
Likely	Chickenpox Cold sores Erysipelas Insect bites
Unlikely	Cellulitis Dermatitis Scabies
Very unlikely	Bullous pemphigoid Staphylococcal scaled skin syndrome Pemphigus vulgaris

Table 9.46
Specific questions to ask the patient: Impetigo

Question	Relevance
Location	Face suggests impetigo, cold sore, erysipelas, pemphigus vulgaris or staphylococcal scaled skin syndrome. Wrists suggests scabies. Hands or feet suggests bullous pemphigoid.
Nature of rash	Crusty honey coloured suggests impetigo. Vesicles suggests chickenpox, insect bites. Raised with sharp borders suggests erysipelas. Painful suggests cellulitis or staphylococcal scaled skin syndrome. Dryness of the skin suggests dermatitis. Blistering suggests bullous impetigo, bullous pemphigoid, staphylococcal scaled skin syndrome or pemphigus vulgaris.
Evolution	Face to extremities suggests impetigo. Face to trunk suggests chickenpox.
Systemic symptoms	These suggest erysipelas or cellulitis.
Prodromal symptoms	These suggest chickenpox or cold sores.
Other symptoms	Itch suggests chickenpox, cold sores, insect bites, scabies, dermatitis or bullous pemphigoid.

Clinical features of impetigo

The *nonbullous form* is mostly located on the face or extremities. It tends to start with a single red macule that develops into a pustule or vesicle, which then ruptures, releasing exudate that dries and crusts over into a characteristic honey colour (see Fig. 11.7). It can spread rapidly usually because of autoinoculation. Lesions may be mildly itchy. The *bullous* form presents similarly except that bullae (1–2 cm in diameter) are present; are often more widespread; and systemic symptoms of malaise, fever and lymphadenopathy are often present.

Conditions to eliminate

Likely causes

Chickenpox

Chickenpox is very common and is probably the most likely infectious childhood rash seen in community pharmacy. Before the rash develops, the patient might experience up to 3 days of prodromal symptoms that could include fever, headache and sore throat. The rash typically begins on the face, stomach and back before spreading to other parts of the body. Initially, lesions appear as small red lumps that rapidly develop into vesicles, which crust over after 3 to 5 days. New lesions tend to occur in crops of three to five for the first 4 days; at the height of infectivity, lesions appear in all stages of development (see Fig. 11.6). The vesicles are often extremely itchy. See Chapter 11 for differentiation from other childhood skin rashes other than impetigo.

Cold sores

Patients typically experience prodromal symptoms of itching, burning, pain or tingling symptoms 6 to 48 hours before skin eruption. The lesions appear as blisters and vesicles with associated redness on the outer lip (see Fig. 9.41). These crust over, usually within 24 hours, tend to be itchy and painful and might bleed.

Erysipelas

Erysipelas is a superficial form of cellulitis that most often affects infants and older people but can affect any age group. It is characterized by acute onset often accompanied by fevers, chills and shivering. The lower limbs are most affected, but it can involve the face with a characteristic butterfly distribution on the cheeks and across the bridge of the nose. The rash itself is bright red, firm and swollen with a very sharp, raised border.

Insect bites

Itching papules, which can be intense, is the hallmark symptom of insect bites. Weals, bullae and pain can occur, especially in sensitized individuals. Lesions are often localized and grouped together and occur on exposed areas, for example, the hands, ankles and face (see Fig. 9.51).

Unlikely causes

Cellulitis

Cellulitis is a bacterial infection that usually affects the lower legs and is usually unilateral. The first symptoms and signs of infection are systemic symptoms such as feeling unwell, fever or chills. The rash soon follows and typically a localized area of painful, red and swollen skin (see Fig. 9.45).

Dermatitis

All forms of dermatitis cause redness, drying of the skin, irritation and pruritus to varying degrees and might show papules and vesicles and can affect all areas. Itching is a prominent feature unlike in impetigo.

Scabies

Severe itch is a hallmark symptom and should be enough to eliminate from impetigo regardless of rash can present looking superficially like impetigo.

Very unlikely causes

Bullous pemphigoid

Pemphigoid is a rare blistering autoimmune disorder that usually affects people older than the of age 70 years who have neurologic disease, particularly stroke, dementia or Parkinson's disease. It causes severe itch and usually large bullae that rupture, forming crusted erosions. A dermatitis-like rash may be present for weeks before any blisters appear. Any part of the skin can be involved, but the most common sites are the body folds, hands and feet.

Staphylococcal scaled skin syndrome

This is a rare, severe, superficial blistering skin disorder affecting children younger than 5 years old. Initially, nonspecific symptoms are experienced, such as irritability or lethargy, before a widespread painful rash appears that blisters, leaving patches of skin that look like a burn. It typically starts on the face and flexural regions.

Pemphigus vulgaris

This is a rare autoimmune condition characterized by painful blisters and erosions on the skin and inside of the mouth. The blister occur mostly on the upper chest, back, scalp and face.

Red flags indicative of referral: Impetigo

Reason for referral	Why referring	Timeframe for referral
• Rash associated with large bullae or blisters	• Suggests bullous impetigo, bullous pemphigoid, staphylococcal scaled skin syndrome, or pemphigus vulgaris	• Urgent GP referral
• Systemically unwell	• Suggests infection that outside pharmacist's remit	

Evidence base for over-the-counter medication and practical prescribing

Good personal hygiene (see the 'Hints and tips' in Box 9.10) and topical or systemic treatment are advocated for the treatment of nonbullous impetigo. Through UK Patient Group Directions, the choice of agent should depend on how widespread the infection is and if the patient is allergic to first-line treatments.

Localized impetigo (up to three lesions)

Hydrogen peroxide 1% cream (e.g., Crystacide 1% cream) or fusidic acid 2% can be applied two or three times daily for 5 days to those aged 1 year and older.

HINTS AND TIPS BOX 9.10: Self care advice for impetigo

Public Health England exclusion recommendations	• Children and adults should stay away from school and other childcare facilities or work until all lesions are healed, dry and crusted over or until 48 hours after initiation of treatment. • Food handlers are required by law to inform employers immediately if they have impetigo.
General hygiene measures	• Do not share towels or other personal care products. • Wash hands regularly. • Avoid scratching lesions.

Widespread impetigo

A 5-day course of a topical (fusidic acid 2% can be applied two or three times daily) or oral antibiotic should be offered to those aged 1 year and older. First-line oral antibiotic is flucloxacillin or a macrolide antibiotic when flucloxacillin cannot be given. For flucloxacillin, the dosages are:

- Children aged 1-2 years of age: 125 mg four times a day
- Children 2–9 years: 250 mg four times a day
- Those older than 10 years: 500 mg four times a day

Self-assessment questions

The following questions are intended to supplement the text. Two levels of questions are provided, multiple-choice questions and case studies. The multiple-choice questions are designed to test knowledge and the application of knowledge, and the case studies allow this knowledge to be put in context in patient scenarios.

Multiple-choice questions

9.1. In which ONE of the following conditions is scaling the most prominent?

a. Allergic dermatitis
b. Scabies
c. Fungal infection
d. Plaque psoriasis
e. Lichen planus

9.2. Which ONE of the following best describes the clinical presentation of lichen planus?

a. Clustered vesicular pruritic
b. Golden coloured crusts
c. Pruritic, red plaques
d. Pruritic, red, large fluid-filled blisters
e. Salmon coloured plaques with silvery scale

9.3. A lesion described as flat and less than 1 cm in diameter is known as which ONE of the following?

a. Papule
b. Macule
c. Patch
d. Comedone
e. Nodule

9.4. Which ONE of the following lesion symptoms or signs is not associated with suspected skin malignancy?

a. Symmetry
b. Change in sensation
c. Change in colour
d. Irregular border
e. Lesion growth

9.5. Mrs LK, 20 years old, seeks your advice about a rash on her arm below her elbow. She tells you that it appeared about 10 to 14 days ago and is mildly itchy. She has no other symptoms and has no other medical conditions. Which ONE of the following is the most likely cause of her symptoms?

a. Contact dermatitis
b. Atopic dermatitis
c. Tinea corporis
d. Discoid eczema
e. Psoriasis

9.6. Which ONE of the following statements best describes severe acne?

a. Lesions only on the face that are a mixture of pustules and nodules; scarring is likely
b. Lesions affecting the face only that cause pain
c. Lesions affecting the face, back and chest that are a mixture of pustules and nodules; scarring is unlikely
d. Lesions affecting the face, back and chest, which are a mixture of pustules and nodules; scarring is likely
e. Lesions affecting the back and chest, which are a mixture of pustules and nodules; scarring is likely

9.7. Mr SW, a 32-year-old male, asks for advice on a skin rash on his arm near his elbow. It is raised, pink and mildly itchy. From the listed conditions, which ONE of the following is most likely?

a. Psoriasis
b. Discoid eczema
c. Fungal infection
d. Atopic dermatitis
e. Seborrhoeic dermatitis

9.8. A middle-aged female complains of red papules and pustules on her forehead and her cheeks. There are no open comedones present. These symptoms indicate which ONE of the following dermatologic conditions?

a. Shingles
b. Rosacea
c. Urticaria
d. Acne vulgaris
e. Seborrhoeic dermatitis

9.9. An adult patient presents to the pharmacy with a rash. It is located on the left leg. Based solely on location, which ONE of the following conditions is it most likely to be?

a. Shingles
b. Ringworm
c. Urticaria
d. Discoid eczema
e. Seborrhoeic dermatitis

9.10. Many medicines are implicated in causing hair loss. Which of the following is MOST likely to cause hair loss?

- **a.** Clopidogrel
- **b.** Dabigatran
- **c.** Ibuprofen
- **d.** Omeprazole
- **e.** Ramipril

9.11. Basal cell papillomas are characterized by which ONE of the following?

- **a.** Itch
- **b.** Exuding and crusting
- **c.** Colour changes
- **d.** Scaling
- **e.** Asymptomatic

Questions 9.12 to 9.16 concern the following medicines:

A. Clotrimazole
B. Miconazole
C. Benzoyl peroxide
D. Salicylic acid
E. Nicotinamide
F. Benzyl benzoate
G. Minoxidil

Select, from A to G, which of the medicines:

9.12. Is best avoided in people with diabetes
9.13. Can bleach clothing
9.14. Can be used for oral fungal infections
9.15. Can produce systemic side effects
9.16. Is most associated with skin irritation

Questions 9.17 to 9.25 concern the following conditions:

A. Chickenpox
B. Cold sores
C. Impetigo
D. Pityriasis versicolor
E. Psoriasis
F. Lichen planus
G. Tinea corporis
H. Fifth disease
I. Molluscum contagiosum
J. Pityriasis rosea

Select, from A to J, which of the conditions:

9.17. Is associated with a facial rash often resembling a ‘slapped cheek’
9.18. Can be mistaken for warts
9.19. Is associated with moderate to severe itching
9.20. Sunlight can trigger symptoms
9.21. Itching, burning or tingling symptoms precede appearance of the lesions
9.22. Reinfection results in shingles
9.23. Is associated with a herald patch
9.24. Central clearing of the rash is often observed
9.25. Is bacterial in origin

Answers

9.1. Answer: d

Rationale: Allergic dermatitis (a) and scabies (b) are associated with itch but not scaling; the others could cause scaling, but plaque psoriasis (d), being caused by increased cell turnover, exhibits scaling as an obvious clinical feature.

9.2. Answer: c

Rationale: a seems a good fit for scabies or shingles, b describes impetigo, d sounds like bullous pemphigoid and e describes psoriasis.

9.3. Answer: b

Rationale: Papules (a), comedones (d) and nodules (e) are all raised lesions. This leaves macules (b) and patches (c) as viable options. Patches are large, so macule is the correct answer.

9.4. Answer: a

Rationale: Malignancy can be assessed through checklists, such as ABCDE. Using this, changes should be viewed with suspicion. On this basis, symmetry (a) is the correct answer.

9.5. Answer: e

Rationale: Concentrating on mild itch, contact (a) and atopic dermatitis (b) and discoid eczema (d) can be eliminated because they have itch as a prominent symptom. Tinea corporis (c) is also moderately to severely itchy. Psoriasis (e) is most likely because it tends to be a condition that causes mild or no itch.

9.6. Answer: d

Rationale: Severe acne affects the face, back and chest; on this basis, options a, b and e can be discounted. Scarring is likely, so c can be discounted, leaving d as the right option.

9.7. Answer: a

Rationale: Based on location, discoid eczema (b; legs), seborrhoeic dermatitis (e; face or trunk) and fungal infection (c; mostly body) can be discounted. Atopic dermatitis (d) based on intensity of itch is unlikely. Psoriasis (a) shows lesions near flexures and is mildly itchy.

9.8. Answer: b

Rationale: Urticaria (c) and seborrhoeic dermatitis (e) do not present with papules. Shingles (a), although it can occur on the face, is unlikely to have papules. Acne (d) and rosacea (b) are possible but in the absence of comedones and the age of the patient, this strongly points to rosacea.

9.9. Answer: d

Rationale: Shingles (a) is usually on the face or back. Ringworm (b) is usually the trunk. Urticaria (c) can affect any body part. Seborrhoeic dermatitis (e) is face and chest. Discoid eczema (d) tends to be on the lower limbs.

9.10. Answer: d

Rationale: The incidence of hair loss with clopidogrel (a), ramipril (e) and dabigatran (b) is unknown. Hair loss with ibuprofen (c) is very rare and is rare with omeprazole (d).

9.11. Answer: e

Rationale: Basal cell papillomas are noticed with advancing age and often go unnoticed initially because of their symptomless presentation.

9.12. Answer: d

Rationale: Any product that could damage skin or be destructive is best avoided in patients with diabetes. Salicylic acid (d) works by destroying skin cells and should not be used.

9.13. Answer: c

Rationale: Peroxide-based products can have a whitening effect (and on this basis are also included in products for tooth whitening).

9.14. Answer: b

Rationale: Only a and b are suitable for fungal infections. Clotrimazole (a) is used for superficial skin infections, but miconazole (as Daktarin oral gel) can be used to treat oral thrush.

9.15. Answer: g

Rationale: Although all products are topically applied, skin penetration may result in systemic absorption. This has been reported only with minoxidil (g) from this list.

9.16. Answer: f

Rationale: Azoles (a and b) have very few reports of skin irritation, as has nicotinamide (e). Salicylic acid (d) can cause skin destruction; therefore, if it is used incorrectly, it can cause skin pain and irritation; Benzoyl peroxide (c) is associated with skin irritation, especially when first applied or at high strength. However, benzyl benzoate (f) is a known skin irritant and is most likely to cause this problem.

9.17. Answer: h

Rationale: Concentrating on the location of the face, the options that should be considered are chickenpox (a), *cold sores (b), impetigo (c) and fifth disease (h). Cold sores and impetigo tend to be located around the mouth and nose rather than the cheek, and although chickenpox sores can appear on the cheeks, they appear as discrete vesicles and not as flat patchlike lesions, as in fifth disease.*

9.18. Answer: i

Rationale: Warts are raised lesions. On this basis, all lesions on the list that are flat can be eliminated. This leaves chickenpox (a), cold sores (b), impetigo (c), psoriasis (e), lichen planus (f) and molluscum contagiosum (i) as possible options. From these options, those that weep or form exudate can also be eliminated, meaning chickenpox (a), cold sores (b) and impetigo (c). Psoriasis (e) and lichen planus (f) are only slightly raised lesions and are usually red-brown and do not resemble warts.

9.19. Answer: a

Rationale: Itch is a hallmark symptom of most skin rashes, although the severity experienced varies. Mild itch is seen with cold sores (b), psoriasis (e), pityriasis versicolor (d) and rosea (j). Tinea corporis (g) may show a moderate itch. However, a hallmark symptom of chickenpox (a) is intense and severe itching.

9.20. Answer: b

Rationale: Triggers sometime are associated with the development of skin rashes; most notably, sunlight can precipitate cold sores (b). Pityriasis versicolor (d) is associated with warm climates, but this is not a trigger.

9.21. Answer: b

Rationale: Few skin lesions are preceded with symptoms before the development of a rash. From the list, chickenpox (a), cold sores (b) and pityriasis rosea (j) can show such symptoms. In chickenpox, coldlike symptoms are experienced, and in pityriasis rosea, a herald patch is seen.

9.22. Answer: a

Rationale: The herpes zoster virus is the cause of shingles. From the list, only a, b, d, h and i are viral in origin. Of these, chickenpox (a) is caused by the herpes virus, and reactivation results in shingles.

9.23. Answer: j

Rationale: Not many skin rashes start with a discrete lesion before the full rash develops. This is only seen in j; however, singular lesions of tinea could be mistaken.

9.24. Answer: g

Rationale: Chickenpox (a), cold sores (b), impetigo (c) and molluscum contagiosum (i) show a vesicular or papular-like rash and therefore can be discounted. All other conditions present with macular or patchlike lesions and so need to be considered. All but fungal infection show concolourous lesions.

9.25. Answer: c

Rationale: a, b, d, h and i are viral causes. Pityriasis (d) and tinea (g) are yeast or fungal infections. Lichen planus (f) and pityriasis rosea (j) causes are still unclear. Psoriasis (e) is multifactorial but related to increased cell turnover. Only impetigo (c) is bacterial in origin.

Case studies

CASE STUDY 9.1

Mr RJ and his 9-year-old son Jimmy want to buy something for Jimmy's verruca. Mr RJ thinks that Jimmy has had the verruca for about 4 to 6 weeks. He describes it as a circular discoloured piece of skin that looks like the verrucas he used to get.

a. What course of action are you going to take?

Try to directly question Jimmy. See if Jimmy knows how long the suspected verruca has been there. Ask if the lesion is causing any pain when walking. Instead of asking for further descriptions of what the lesion looks like and where it is positioned, ask if you can look at the lesion.

On further questioning and examination, you concur with the father's diagnosis of a verruca. The lesion is small (<0.5 cm in diameter) and causes minimal pain when direct pressure is applied.

b. What are you going to recommend?

A salicylic acid-based product is the most suitable product; you recommend Bazuka after first making sure that Jimmy does not have diabetes.

Mrs RJ returns with Jimmy 6 weeks later and demands to see the pharmacist. She says the stuff you recommended is 'rubbish', and Jimmy's verruca is bigger than it was before.

c. How are you going to respond?

First, you must stay calm and not be defensive. Many patients have unrealistic expectations on how quickly the verruca will resolve with therapy. Did you tell them how long it would take before an effect will be seen? This is a vital piece of information to ensure that patients realize that treatment is not a quick cure.

You find out that Mrs RJ has been applying the Bazuka and doing everything the instruction leaflet says. You inspect Jimmy's feet again, and from what you can remember, the lesion does look slightly larger.

d. Why might this be the case?

Salicylic acid is destructive in nature, and if the product comes into contact with nonaffected skin, it can damage skin and appear to the patient that the lesion has indeed gotten bigger.

Mrs RJ wants to try Bazuka Extra Strength because the normal Bazuka is not helping.

e. What are you going to do?

You must try to stress to Mrs RJ that she should continue with the normal Bazuka because 6 weeks of therapy is not long enough to make a decision to alter therapy. Reluctantly, Mrs RJ accepts your advice and leaves the pharmacy promising she will try for a bit longer.

One week later, she presents a prescription for Cuplex gel for Jimmy.

f. What are you going to do?

It appears that Mrs RJ was not satisfied or convinced with your advice and has decided to see her GP. You do not know whether Mrs RJ told the doctor about using an OTC product. You could ring the GP to tell him or her that Mrs RJ has been using a salicylic acid–based product already; however, this is likely to have little bearing on the outcome of product selection because Jimmy will still need to continue treatment with something for a few more weeks. The prescription should be dispensed and Mrs RJ counselled appropriately. It would be unprofessional to point out that Cuplex is unlikely to be any better than Bazuka.

When you hand Mrs RJ the Cuplex, she mentions that the doctor said this was stronger than Bazuka and should do the trick.

g. How do you reply?

Be diplomatic and nonjudgemental. It is likely that the doctor knows that Cuplex is no better than Bazuka, but if the parent is convinced that what she is now getting is superior to the previous product, her motivation to comply with directions might be better. It might be worth asking the doctor next time you have a conversation what the rationale was for prescribing Cuplex.

CASE STUDY 9.2

Ms AH is the mother of an infant son aged 4 months. She asks for your help in treating the flaky skin on his scalp. She says he has had the problem on and off for the past 6 weeks. She hasn't yet tried anything except baby shampoo, as recommended by the health visitor. However, she now wants a cream or something to get rid of the problem once and for all.

a. What further information do you require to be able to help her?

Based on the description given, it seems likely the baby has cradle cap. Before giving any advice or a possible product, you need to know more about the symptoms: does the baby appear to be irritable? What extent of the scalp does the rash affect? Is there a family history of atopy or other dermatologic conditions in the family?

After questioning, you decide the child has cradle cap.

b. What treatment are you going to recommend?

The use of a mild tar-based product every other day until the scalp clears would be appropriate. In between using the tar-based product, the mother should be instructed to keep using the baby shampoo.

Ms AH returns to the pharmacy 2 weeks later with another of her children. Impressed that her son's scalp is now clear, she now wants some advice for her 7-year-old daughter. She has a sore on the corner of her mouth.

c. What further information do you require to be able to help her?

- *How long has the sore been present?*
- *How did the sore first develop?*
- *What symptoms are associated with the sore?*
- *The progression of the sore. Has it spread?*
- *Previous history of the rash and any family history*

You find out the sore appeared overnight and is now itchy. On inspection, the lesion appears to be weeping a clear exudate. The rash has not spread, and this is the first time she has had such a sore.

d. What is the most likely diagnosis?

Based on this information, the likely diagnosis is either a cold sore or impetigo.

e. How could the two likely problems be differentiated?

Given the presentation, it seems difficult at this present time to be confident of the diagnosis. You could ask if her child experienced any symptoms before the rash appeared. In cold sores, prodromal symptoms often occur, but in impetigo, it would be much more likely that the lesions would present without previous symptoms.

CASE STUDY 9.3

Mr RT, a 75-year-old male, asks for some cream to help get rid of a rash that started 3 days ago across his side and part of his back. The following questions are asked and responses received. He takes regular medicines for high blood pressure and things since he had a stroke about 1 year ago but is a bit uncertain of all their names.

a. State what the problem representation would be for this patient.

The problem representation could be summed up as 'An older adult male, with multimorbidities, presents with acute rash on his trunk'.

b. Based on the problem representation, what would be your hypotheses as to the cause of Mr RTs rash?

At this stage, it is difficult to think of what a likely diagnosis will be given the number of conditions that can present with skin rash on the torso. Obviously, rashes associated predominantly with younger people can be discounted from your early thinking.

You need more information from Mr RT.

c. What initial exploratory questions will be useful to ask?

Evolution of the rash

Associated rash symptoms

Other lesions elsewhere other than that reported

Any systemic symptoms

You ask the above questions and find out:

- **The rash started on his left side below his armpit and now spread under the armpit but has no other rashes.**
- **It is a bit painful.**
- **He feels a bit unwell, with a slight loss of appetite, and has had the odd headache over the last few days.**

d. Based on these findings, what is your thinking to the cause of his rash?

It appears he has some systemic upset, which suggests an infectious cause

The rash is localized to his torso below his arm, which suggests shingles, and this is supported by the fact he is experiencing pain.

You perform a visual inspection. The rash is linear and vesicular in nature.

e. What further questions could be asked to support your diagnosis?

Has he had chickenpox previously? Shingles can only be a diagnosis if he has had chickenpox previously

Has he experienced any stressful events recently? Shingles can be triggered by a decreased immunity or stressful events.

He says he had chickenpox when he was a child, and he is having a difficult time at the moment because he his wife recently died.

You are now confident of your diagnosis.

f. What safety netting are you going to put in place?

You tell him you think he has shingles and that because he has had his symptoms for less than 3 days, an antiretroviral tablet could be given to help clear up the rash (under a Patient Group Direction such as Pharmacy First). This will last 7 days. If after that time the rash is still present, he needs to come back to be reassessed. You can also tell him that the pain associated with the rash can be managed with simple analgesia such as paracetamol. However, it is likely the pain may persist after the rash has cleared up, and this is quite normal. If the paracetamol is not helping, then an alternative medicine could be tried.

You also need to tell him that the rash might get a bit worse before the tablets start to help, and shingles is infectious, so he could pass it on to others, so he needs to use his own towels rather than share. To help reduce any irritation from the rash, he should wear loose-fitting shirts.

*You could also signpost him to sources of information. If he is internet literate, then he could look at the Shingles Support Society's site (*https://shinglessupport.org.uk*) because it is unlikely he will remember everything you have just told him.*

CASE STUDY 9.4

Mr AC, a male in his late 20s to early 30s, presents with a very itchy rash on his left hand, which he has had for a few days. He asks if you can give him a cream to stop the itching. He takes sodium valproate for epilepsy which is well controlled.

a. State what the problem representation would be for this patient.

Young adult male with epilepsy presents with acute itchy rash on the hand.

b. Based on the problem representation, what would be your hypotheses as to the cause of Mr RT's rash?

Rashes that often affect the hand are:

- *Dermatitis*
- *Hand, foot and mouth disease*
- *Impetigo*
- *Insect bites*
- *Lichen planus*
- *Palmoplantar psoriasis*
- *Pompholyx*
- *Prurigo nodularis*
- *Scabies*

However, this list can be shortened regarding the likely diagnosis because not all these listed have moderate to severe itch. Those to be considered are:

- *Dermatitis*
- *Insect bites*
- *Pompholyx*
- *Scabies*

However, some form of dermatitis is the most common cause of an itchy hand rash.

c. What initial exploratory questions will be useful to ask?

How did the rash develop? Exposure to an irritant often causes dermatitis.

Other lesions elsewhere other than that reported: With allergic or atopic dermatitis, other lesions can be present elsewhere.

History of rash: People with dermatitis often have a history of dry skin.

You find out that he cannot recall any exposure to chemicals or new tasks involving his hands, he hasn't noticed any other rashes and he doesn't have dry skin.

d. Based on these findings, what is your thinking, and what further questions might you ask?

His responses do not match well for a diagnosis of dermatitis.

Given that he cannot remember an event that triggered the rash, this also counts against the rash being caused by insect bites. Scabies and pompholyx need to be considered because both can exhibit intensely itchy vesicles on the hand. Asking about occupation and if itching is worse at any time may help differentiate between the two. Scabies is associated with nighttime itching and contracted by close personal contact.

You find out that he works for the National Health Service doing patient transports, and the itch is constant and seems to be not limited to his hands.

You make a differential diagnosis of scabies.

e. What safety netting are you going to put in place?

You tell him that you think his rash might be scabies, and using permethrin cream will get rid of the problem. After using treatment, he will be able to return to work. It will be important to tell him the correct use of permethrin, including advice on washing clothes and bed linens. You also need to tell him about treating household members.

CASE STUDY 9.5

Atopic dermatitis, ICD and ACD can present in similar ways.

a. For each condition, name the features and causative factors that are common to all three.

All present as sore, red, itchy skin lesions.

A major factor in all three is the impaired barrier function of the epidermis, leading to increased loss of water—dry, cracked skin that allows entrance of irritants and allergens.

b. How do each of the three forms of dermatitis differ in their expression?

Atopic eczema is caused by internal factors. Causes are thought to involve genetics, environmental triggers and defects in the epidermal skin barrier and the immunologic response.

ICD is caused by exogenous (external) factors. An irritant must penetrate the outer skin layer to initiate the physiological response, for example, detergents, soaps, solvents, abrasives and oils.

For ACD, sensitization must occur through specific cell-mediated sensitization by an allergen. Future exposure to the same allergen triggers memory T cells to initiate the inflammatory response. Lesions may appear at sites distant from the sight of exposure, for example, nickel and chromate, cement, cosmetics, rubber, dyes and topical corticosteroids

c. What other common dermatologic conditions that cause moderate itch need to be considered when differentiating dermatitis?

Discoid dermatitis: Clear edges, circular or oval, symmetrical distribution

Fungal infections: Clearly defined edge, central clearing

Pompholyx: Blisters on hands and soles of the feet

Scabies: Intensely itchy, classically at night

Urticaria: Skin shows signs of oedema and blanches if pressed

Chapter 10

Musculoskeletal conditions

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Background

The musculoskeletal system is composed of hard (bone and cartilage) and soft (muscles, tendons and ligaments) tissues. It is responsible for mobility and provides protection to vital structures. Musculoskeletal problems tend to occur because of injury or organic illness, with most patients presenting to a community pharmacist with an acute problem arising from injury. The key role of the pharmacist when dealing with a patient with a musculoskeletal problem is to try to establish the cause, its effect on quality of life, and whether it can be self-managed or requires further investigation.

General overview of musculoskeletal anatomy

The skeletal system of the human body is composed of 206 bones. At the point of contact between two or more bones, an articulation (joint) is formed. This system of bones and joints maximizes movement while maintaining stability. There are two basic types of joints:

- Synovial joints: allow considerable movement (e.g., shoulder or knee)
- Fibrocartilaginous joints: completely immoveable (e.g., the skull) or permit only limited motion (e.g., spinal vertebrae)

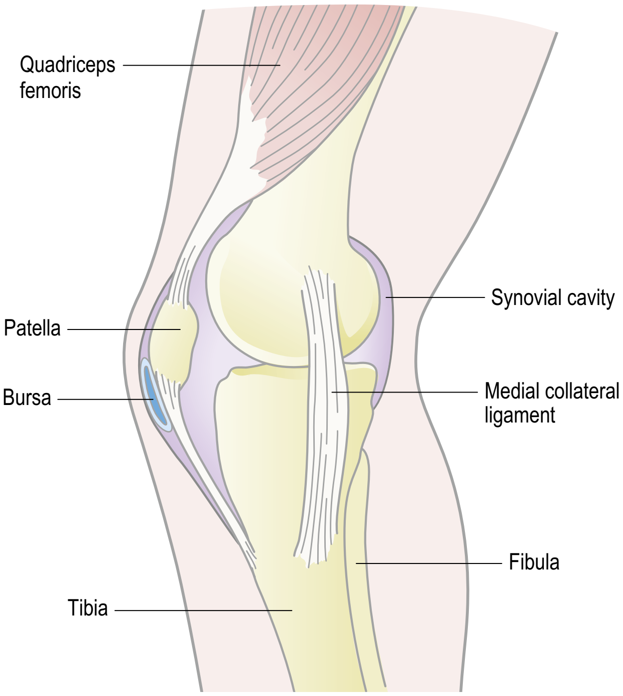

Fig. 10.1 The knee joint, medial view.

Bones and joints cannot move by themselves. The integrity of the musculoskeletal system depends on the interaction between skeletal muscle and bones, and coordinated movement is only possible because of the way muscle is attached to bone. Tendons attach the end of the muscle to the bone or another structure on which the muscle acts. To perform such a function, tendons are composed of very dense fibrous tissue.

Joints require additional stability and support. Strong bands of fibrous tissue known as ligaments bind together bones entering a joint to provide this additional support and stability. It is often the integrity of the connecting structures that is damaged in a musculoskeletal injury. The simplified diagram of the medial aspect of the knee joint in Fig. 10.1 illustrates the relationship of the connective structures to the skeleton and musculature. The knee joint is an example of a synovial joint. The femur, tibia and fibula do not touch each other because they are covered with articular cartilage and separated by the synovial cavity. The knee joint also contains bursae, small fluid sacs, which provide protection at points in the joint where friction or pressure is high.

History taking and physical examination

Information gathering should concentrate on when the problem occurred, what precipitated it, the level of discomfort, any restriction in range of motion and whether the symptoms are worsening (Table 10.1). This should allow decisions to be made as to whether it can be managed or referred for further evaluation. In addition, a range of physical examinations and tests can be performed to help with the diagnosis (Table 10.2).

Table 10.1
General musculoskeletal questions to ask the patient

Question	Relevance
Acute vs chronic pain	• Acute presentations suggest injury or conditions such as gout. • Chronic pain is common in arthritic pain.
Traumatic injury	• The closer the time between injury and presentation, the more likely the injury requires urgent medical assessment.
Presenting symptoms	• Marked swelling, bruising and pain occurring right after injury are suggestive of more severe injury, and referral to casualty for radiographs and further tests is needed.
Precipitating factors	• Many problems are caused by sport injury or repetitive movements associated with occupation.
Range of motion	• A marked reduction in normal range of motion require further assessment.
Nature of pain	• Referred pain suggests nerve root compression (e.g., a shoulder injury in which pain is also felt in the hand). • Pain that is insidious in onset and progressive is more likely to be caused by some form of degenerative disease or malignancy.
Age of patient	• **Children:** Bones are softer in children and therefore more prone to greenstick fractures (fracture of the outer part of the bone) and should be referred. • **Older adults:** Arthritic conditions, osteoporosis, and malignancy are more common.

Low back pain

Background

Low back pain is experienced in the lumbosacral area of the back, between the bottom of the ribs and the top of the legs. Acute back pain is classified as episodes lasting 12 weeks or less and chronic if symptoms persist beyond 12 weeks.

Prevalence and epidemiology

Low back pain is common and is the single leading cause of disability worldwide. Low back pain can be experienced at any age, and 60% to 90% of adults experience an episode of low back pain at some point in their adult lives. The prevalence is highest in those aged 50 to 55 years old and is more prevalent in females; 50% to 90% of pregnant females develop low back pain. It is most common in those with skilled manual, partly skilled and unskilled jobs.

Table 10.2
Physical examination procedures (selected) to aid diagnosis of common musculoskeletal problems

Test	Checks for	Positive result
Shoulder		
Supraspinatus test	Rotator cuff	Any pain or reduced strength, especially if unilateral, is indicative of a supraspinatus tendon injury.
Apprehension test	Shoulder instability	Patient will prevent further rotation
Cross body abductor test	Acromioclavicular joint injury	Induces pain over the joint
Back		
Straight leg raising test	Sciatica	Induces pain
Elbow		
Cozen's or Mill's test	Lateral epicondylitis	Pain induced at the lateral epicondyle
Polk's test	Lateral and medial epicondylitis	Pain when lifting an object when the forearm is in pronation (palm facing the floor) Pain when lifting an object when the forearm is in supination (palm facing up)
Wrist		
Finkelstein test	De Quervain's tenosynovitis	Pain along the thumb
Tinel's sign	Carpal tunnel Ulnar neuropathy	Tapping over the affected nerve produces pins and needles feeling.
Phalen's sign	Carpal tunnel	Induces burning, tingling or numbness
Knee		
Lachman, anterior drawer and pivot shift tests	Anterior cruciate ligament injuries	Tests results are positive depending on the amount of movement seen.
Foot		
Windlass test	Plantar fasciitis	Reproduction of pain by extension of the first metatarsophalangeal joint

Occupational risk factors in developing back pain include those who perform heavy manual labour, frequent bending, twisting and lifting and people who remain in static positions for prolonged periods of time such as truck and car drivers who drive long distances each year. Sports that involve excessive twisting, such as golf and gymnastics, can also lead to back pain. Other risk factors include obesity and psychosocial causes, for example, anxiety and depression.

Aetiology

Pain originates from the lumbosacral region and is often mechanical in origin (Fig. 10.2), although in many cases, an exact cause cannot be determined, and it is often referred to as simple, non-specific or uncomplicated low back pain.

Arriving at a differential diagnosis

Most patients (90–95%) who present in the pharmacy have simple back pain that will, in time, resolve with conservative treatment. The remaining cases have back pain with associated nerve root compression. Serious underlying pathology is very rare.

Table 10.3 highlights the conditions that may be encountered. Asking back pain–specific questions helps to establish a differential diagnosis (Table 10.4).

Table 10.3
Causes of back pain and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Simple back pain
Likely	• Sciatica • Urinary tract infection or pyelonephritis
Unlikely	• Kidney stones • Osteoarthritis • Osteoporosis • Pancreatitis • Shingles • Stenosis
Very unlikely	• Ankylosing spondylitis • Cauda equina syndrome • Malignancy (usually metastases) • Osteomyelitis • Vertebral fracture

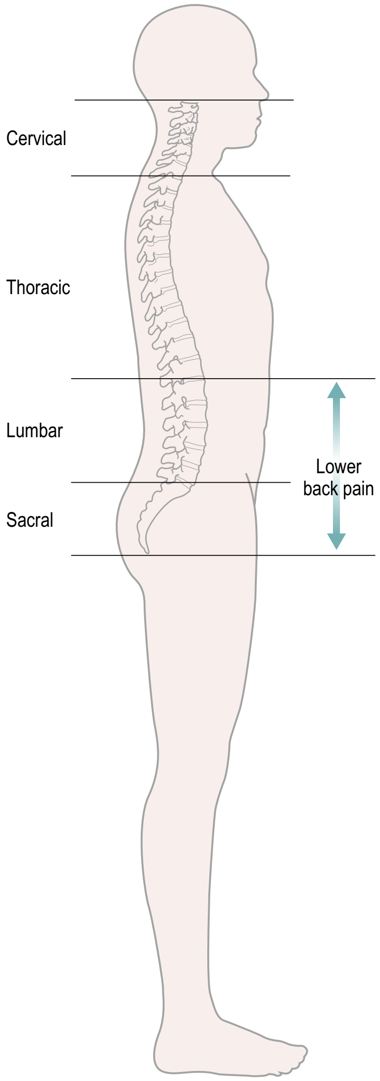

Fig. 10.2 Location and distribution of lower back pain. L4 to L5 pain radiates down the outer calf and onto the top of the foot. L5 to S1 pain radiates to the outside and sole of the foot.

Clinical features of low back pain

Pain in the lower lumbar or sacral area is usually described as aching or stiffness. Depending on the cause, pain might be localized (e.g., lumbosacral strains after physical activity) or more diffuse (e.g., from postural backache after sitting incorrectly for a prolonged period). In cases of acute injury, the symptoms come on quickly, and there will be a reduction in mobility.

Bad posture when seated and poor lifting technique when performing daily tasks, such as cleaning or gardening, are very common predisposing factors. Recurrence is common and may develop into chronic low back pain.

Conditions to eliminate

Likely causes

Sciatica

Sciatica typically occurs in healthy middle-aged adults. Pain is acute in onset and radiates to the leg. Pain starts in the lower back, and as it intensifies, it radiates into the lower extremities. Disc herniation usually involves vertebrae between the L4 and L5 and L5–S1 (see Fig. 10.2), although most occur between L5 and S1. If disc herniation is minimal, pain is dull, deep, and aching. Pain spreads from the lumbar spine to the upper part of the leg. If the disc ruptures or herniates under strain, pain is usually lancinating in quality, shooting down the leg like an electric shock. Valsalva movements (e.g., coughing, sneezing or straining at stool) often aggravate pain. Numbness, tingling and muscle weakness in the distribution of a nerve root suggest nerve root compression. To confirm the diagnosis, a straight leg raising test is done whereby the pain of sciatica can be induced by elevating the leg of the patient when lying down. The prognosis is good, although improvement and recovery are often slower than in simple low back pain alone.

Urinary tract infection or pyelonephritis

Unilateral flank pain that can be felt in the lower quadrant associated with nausea, vomiting and fever is the typical presentation in association with lower urinary tract infection symptoms. The onset is often sudden.

Unlikely causes

Kidney stones

Pain is abrupt in onset and starts in the loin, radiating around the flank, and can be experienced in the right lower quadrant. Pain is very severe and colicky in nature. Attacks are spasmodic and tend to last minutes to hours and often leave the person prostrate with pain. The person is restless and cannot lie still. Symptoms of nausea and vomiting might also be present. It is twice as common in males than in females and usually occurs between the ages of 40 and 60 years.

Osteoarthritis

This is associated with advancing age, affecting up to one-third of people older than 65 years of age, and is twice as common in females. It can be localized to a single joint or involve multiple joints; it most commonly affects the hands, knees, hips, neck and low back. It is characterized by pain of insidious onset that progressively increases over months or years, is exacerbated by exertion and is relieved by rest. The affected joints are painful when used and may show a restricted range of motion. Stiffness in the affected joint occurs typically in the morning and after rest but usually only lasts for 15 to 30 minutes.

Osteoporosis

Often osteoporosis is asymptomatic and goes undiagnosed until a fragility fracture occurs, although nonspecific pain or localized tenderness is present if there is vertebral fracture. The condition is most common in postmenopausal females.

Pancreatitis

A mild attack can present with steady epigastric pain that can radiate to the back. Patients generally have fever, nausea or vomiting with associated abdominal tenderness and an elevated heart rate. It is commonly seen in those that misuse alcohol (25% of cases) or have gallstones (50% of cases).

Table 10.4
Specific questions to ask the patient: Back pain

Question	Relevance
Age	• Younger than 15 years: Although back pain is uncommonly reported in children, children do have a higher incidence of identifiable and potentially serious causes, e.g., ankylosing spondylitis, malignancy and Scheuermann disease (although pain is experienced in the upper back and neck, rather than the lower back). • 15–30 years: Prolapsed disc, trauma, fractures, pregnancy or ankylosing spondylitis is more likely. • 30–50 years: Degenerative joint disease (osteoarthritis), prolapsed disc or spondylitis more likely. • Older than 50 years: The incidence of serious underlying disorders increases such as stenosis or malignancy.
Fever or malaise	• These suggest an infection such as urinary tract infection or osteomyelitis.
Radiation	• Pain that radiates into the buttocks, thighs and legs implies nerve root compression. If pain is felt below the knee, it is highly suggestive of sciatica.
Onset	• Acute and sudden onset is likely to be a muscle strain. However, acute low back pain in older adults can result in compression fractures. • Kidney stones, kidney infection and shingles have an acute onset. • Low back pain that is insidious in onset could suggest osteoarthritis, spondylitis or malignancy.
Restriction of movement/mobility	• People with disc herniation usually have difficulty sitting down for long periods. • Mechanical causes of pain are exacerbated with physical activity and relieved by rest.
Aggravating and relieving factors	• Forceful actions (e.g., coughing) can aggravate sciatic pain. • High impact (e.g., car crash) may suggest vertebral fracture.
Precipitating factors	• Often an event triggers symptoms, such as sports or twisting or bending movements (e.g., gardening).

Shingles

Before rash develops, pain can be experienced along the affected dermatome. This is typically stabbing or throbbing and can be severe.

Stenosis

Spinal stenosis usually develops slowly over time and is most common in people older than the age of 50 years. It causes back and leg pain. Symptoms include low back pain, which can develop into sciatica-like pain that typically worsens with standing or walking and gets better with leaning forward. Weakness in the leg or legs can be experienced as the stenosis worsens.

Very unlikely causes

Ankylosing spondylitis

Spondylitis is characterized by thinning or loss of elasticity of the discs that cushion the vertebrae of the spine. Almost all cases occur before the age of 40 years, it is two to three times more common in males and it tends to run in families. Symptoms are slow in onset and gradually worsen over a period of several months to several years. Patients commonly exhibit fatigue and have marked stiffness on awakening, with pain that can alternate from side to side of the lumbar spine. Pain may awaken the person at night and worsens at rest but improves with physical activity. Pain can be made worse by bending, lifting and prolonged sitting in one position. Up to 40% of patients may also show inflammation of the eye.

Cauda equina syndrome

When the cauda equina nerve bundle is compressed, it can result in low back pain and sciatic nerve pain in both legs, bowel and bladder incontinence and loss of feeling in the inner thighs.

Malignancy (usually metastases)

Malignancy is very rare. It is more prevalent in patients older than 50 years of age. Patients normally have symptoms for months before diagnosis because of the slow-growing nature of the tumour. A history of unexplained weight loss, presence of anaemia and leg weakness might be seen in addition to low back pain.

Osteomyelitis (infection)

Symptoms of osteomyelitis include bone pain, general malaise and the presence of a high-grade fever. There may be local swelling, redness and warmth at the site of the infection. Patients also usually exhibit a loss of range of motion, limp or have a reluctance to weight bear.

Vertebral fracture

Fractures occur because of trauma of high impact (e.g., car accidents, sports injuries). Moderate to severe pain is experienced that is worsened with movement. Often injuries involve nerve involvement, leading to bowel or bladder dysfunction, numbness, tingling or weakness in the limbs.

Red flags indicative of referral: Back Pain

Reason for referral	Why referring	Timeframe for referral
Bowel or bladder incontinence	Suggests cauda equina syndrome	Very urgent referral to the accident and emergency department (A&E)
Numbness or weakness Persistent and progressively worsening pain Unexplained pain in a young or older person Weight loss	Sinister pathology needs ruling out	Urgent referral to a general practitioner (GP)
Associated fever or systemically unwell	Suggests infection	As soon as practicable to a GP
Back pain from structures above the lumbar region	Outside the scope of community pharmacist	

Evidence base for over-the-counter medication

Conservative treatment

Bed rest was once widely prescribed for patients with low back pain. However, systematic reviews have now proven that prolonged bed rest is counterproductive, and people may experience small benefits in pain relief and functional improvement from staying active (Dahm et al., 2010).

Exercise programmes can help with acute back pain and have been shown to reduce recurrence.

Analgesics

Nonsteroidal antiinflammatory drugs (NSAIDs) are widely advocated. A systematic review of NSAIDs in acute or chronic low back pain found that treatment with an NSAID produced significant short-term improvement compared with placebo (Roelofs et al., 2008). The review identified 65 trials, 28 of which were rated as high quality. The study failed to find any difference among the various NSAIDs. A further Cochrane review (involving 13 trials, of which 10 were rated high quality) looking at chronic low back pain found that only NSAIDs were more effective than placebo in terms of pain intensity and, to a smaller extent, disability (Enthoven et al., 2016). Like Roelofs et al.'s study, this one failed to find any difference among the various NSAIDs.

Paracetamol when used for back pain has also been subject to a review (Saragiotto et al., 2016), which identified three trials involving 1825 patients. They found that paracetamol was no more effective than placebo in terms of pain reduction and improving quality of life. The authors concluded that paracetamol should not be used alone to manage acute back pain, which is current (as of August 2024) CKS advice.

Compound analgesics

It is recognized that combination analgesics (paracetamol–codeine, aspirin–codeine or paracetamol–dihydrocodeine) with high doses of opioids are effective for acute and chronic pain. However, in the United Kingdom, codeine and dihydrocodeine can only be prescribed over the counter (OTC) provided their respective maximum strengths do not exceed 1.5% and the maximum dose does not exceed 20 or 10 mg, respectively. In practice, this equates to commercially available products with a maximum dose of 12.8 mg of codeine and 7.46 mg of dihydrocodeine. At these doses, their pain-killing effect has been called into question.

Caffeine

It has long been claimed that caffeine enhances analgesic efficacy, and a number of proprietary products contain caffeine in doses up to 130 mg. A Cochrane review (Derry et al., 2014a) identified 19 studies ($n = 7238$) that involved mainly paracetamol or ibuprofen, with 100 to 130 mg caffeine. Findings showed that there was a small but statistically significant benefit with caffeine used at doses of 100 mg or more, which was not dependent on the pain condition or type of analgesic. The authors concluded that the addition of caffeine (100 mg) to a standard dose of commonly used analgesics provides a small but important increase in the proportion of participants who experience a good level of pain relief. Considering these data, if recommending caffeine-containing products, only those with 100 mg or more of caffeine should be given.

Topical nonsteroidal antiinflammatory drugs

A 2015 systematic review identified 61 studies comparing topical NSAIDs with oral NSAIDs and placebo (Derry et al., 2015). The review found that topical NSAIDs were significantly better than placebo in achieving 50% pain relief. It also found that the number needed to treat was less than 4 for all the NSAIDs examined compared with placebo and ranged from 1.8 (diclofenac [Emulgel]) to 3.9 (ibuprofen). The review authors stated there were insufficient data to reliably compare topical NSAIDs with each other or with oral NSAIDs but concluded that NSAIDs can provide good pain relief in acute musculoskeletal conditions without the adverse events seen with oral NSAIDs. Furthermore, certain formulations, mainly gel formulations of diclofenac, ibuprofen and ketoprofen, provided the best results. This finding was reinforced when Derry et al. (2017) reviewed all Cochrane reviews investigating topical analgesics.

Rubefacients

Rubefacients (also known as counterirritants) have been incorporated into topical formulations for decades. They cause vasodilatation, producing a sensation of warmth that distracts the patient from experiencing pain. It has also been hypothesized that increased blood flow might help to disperse chemical mediators of pain, although this is unsubstantiated. Numerous chemicals are listed as being rubefacients.

Rubefacients containing salicylates have been reviewed (Derry et al., 2014b). Any evidence of efficacy was reported from smaller older studies; the larger, more recent studies have shown no effect. The authors concluded that current evidence does not support the use of salicylate-containing rubefacients.

Capsaicin

Capsaicin is approved for postherpetic neuralgia and painful diabetic neuropathy (Axsain, capsaicin, 0.075%) and symptomatic relief in osteoarthritis (Zacin, capsaicin, 0.025%) in the United Kingdom via prescription. Although these are not available OTC, a number of OTC products do contain capsaicin (e.g., Radian B Muscle Rub). Systematic reviews of the efficacy of capsaicin show mixed results (Mason et al., 2004; Zhang & Po, 1994). A review by Mason et al. (2004) concluded that capsaicin appears to have only poor to moderate efficacy for patients with chronic musculoskeletal and neuropathic pain. They indicated that it may be a useful second-line agent for those who do not respond to or are intolerant of other treatments; however, capsaicin often causes local side effects (e.g., itching or rash).

Enzymes

Heparinoid and hyaluronidase are included in a number of products. Theoretically, they are supposed to disperse fluids in swollen areas, reducing swelling and bruising, but this is unproven.

Complementary therapies

Back pain accounts for more visits to a complementary practitioner than any other pain condition. In one study, 10% of people complaining of back pain had visited a complementary practitioner (Maniadakis & Gray, 2000).

A limited but growing body of evidence exists to assess whether complementary therapies are effective. Considering the growing public interest and the expanding volume of literature, four Cochrane reviews have been conducted on heat and cold therapy (French et al., 2006), herbal remedies (Oltean et al., 2014), acupuncture (Furlan et al., 2005) and massage (Furlan et al., 2015), respectively.

Superficial heat and cold

Applying heat or cold to musculoskeletal injuries, such as nonspecific back pain, is a popular lay recommendation. These range from hot water bottles, heat pads and infrared lamps to ice packs. A Cochrane review identified nine trials (French et al., 2006) that investigated heat and cold treatments for back pain (six trials involved heat; three trials involved cold therapy). The authors concluded that many of the studies were of poor methodologic quality, but evidence exists that continuous heat wrap therapy reduces pain and disability in the short term to a small extent. No conclusions could be drawn on cold therapy because of the limited nature of the three trials reviewed.

Herbal remedies

Several herbal medicines are promoted as treatments for various types of pain, some of which have been tested for the relief of symptoms of low back pain. The Cochrane review (Oltean et al., 2014) reported on five active constituents—*Harpagophytum procumbens* (devil's claw), *Salix alba* (white willow bark), *Capsicum frutescens* (cayenne), *Solidago chilensis* (Brazilian arnica) and *Symphytum officinale* (comfrey root extract). Devil's claw (standardized daily dose of 50 or 100 mg of harpagoside) reduced pain more than placebo, and a standardized daily dose of 60 mg was equally as effective as 12.5 mg of rofecoxib (now withdrawn from the market). Similarly, willow bark (standardized daily dose of 120 mg and 240 mg of salicin) was also more effective than placebo, and 240 mg of salicin was as effective as 12.5 mg of rofecoxib. Cayenne (as a cream or plaster) reduced pain more than placebo. One trial of arnica ($n = 20$) found very low-quality evidence of reduction in perception of pain and improved flexibility. Likewise, only one trial ($n = 120$) examined comfrey root extract but found low-quality evidence. The authors concluded that the best evidence was for the use of cayenne.

Acupuncture

The available evidence for acupuncture in acute low back pain does not support its use, but if it is used in patients with chronic back pain, acupuncture is more effective for pain relief than no treatment in the short term.

Massage therapy

Twenty-five randomized control trials ($n = 3096$) were identified for the review, although all were of low quality. Only one trial included participants with acute back pain; all others involved people with subacute or chronic back pain. Findings appear to show benefit compared with placebo in the short term but not long term. However, the authors concluded they had 'little confidence' that massage is an effective treatment for patients with low back pain.

Arnica (Arnica montana)

There are only limited studies with arnica, and these have shown mixed results, with it having little or no effect on bruising and swelling in soft tissue injuries. Although generally well tolerated, arnica has been reported to produce allergic reactions in some people.

Summary

Based on evidence, patients with acute low back pain should be encouraged to keep active and be given systemic or topical diclofenac unless contraindicated.

Practical prescribing and product selection

Prescribing information relating to systemic analgesics is discussed below and useful tips relating to systemic analgesics are given in the 'Hints and tips' in Box 10.1.

HINTS AND TIPS BOX 10.1: ANALGESIC ADVICE

Children and aspirin	• Taking aspirin in children has been linked to Reyes syndrome, a rare syndrome in which encephalopathy occurs and, if not diagnosed early, can lead to death.
Caffeine-containing analgesics	• These might have a mild stimulant effect and should therefore be avoided before going to bed.

Paracetamol

Paracetamol should not be used alone. It can be given to all patient groups and has no significant drug interactions, and side effects are very rare. Patients with low back pain benefit most from taking paracetamol regularly at its maximum dosage of 4 g (eight tablets) per day.

Aspirin

The dosage for pain is 300 to 900 mg every 4 to 6 hours with a maximum of 4 g/day. Unlike paracetamol, aspirin is associated with problems in its use. It can cause gastric irritation and is associated with gastric bleeds, especially in older adults. For this reason, aspirin should not be given to this patient group or any patient with a history of peptic ulcer. In a small minority of patients with asthma, aspirin can precipitate shortness of breath, so all patients with asthma who have previously had a hypersensitivity reaction to aspirin should not take it. It should also be avoided in patients taking warfarin because bleeding time is increased. Aspirin is best avoided in pregnancy because adverse effects to the mother and foetus have been reported. It should also be avoided in breastfeeding.

Nonsteroidal antiinflammatory drugs

OTC NSAIDs in the United Kingdom are limited to ibuprofen. The recommended dosage of ibuprofen in adults is 200 to 400 mg (one or two tablets) three times a day, although most patients need the higher dosage of 400 mg three times a day. NSAIDs are best avoided in certain patient groups, such as older adults, because they are more prone to gastrointestinal (GI) bleeds and have reduced renal function. Patients with a history of peptic ulcers and people with asthma who are hypersensitive to aspirin should also avoid NSAIDs. NSAIDs can be used in pregnancy but may delay labour, and their use, particularly in the last trimester, should be under medical supervision. They can be used in breastfeeding. For most patients, NSAIDs are well tolerated, although gastric irritation is a well-recognized side effect. They can interact with many medicines, although most are not significant. NSAIDs can alter lithium levels, so when possible, an alternative analgesic should be recommended.

Topical nonsteroidal antiinflammatory drugs

Topical NSAIDs provide an alternative to patients who should avoid systemic NSAID therapy. They have few side effects, with the most reported problem being skin reactions (maculopapular rash or itching) at the site of application. GI side effects have been reported but are rare. Most manufacturers recommend avoiding use during pregnancy because of the same potential adverse effects as oral NSAIDs, although the risks should be generally far lower than with oral NSAIDs. Topical NSAIDs come in a range of formulations, including cream, gel, spray and mousse, but based on the Derry et al. (2015) Cochrane review on topical NSAIDs, diclofenac gel should be recommended. Nurofen medicated plaster is also available that contains ibuprofen (one patch every 24 hours for patients older than 16 years of age).

Rubefacients

Most rubefacients (e.g., Deep Heat, Radian B ranges) are only licensed for people older than 12 years, although there are a few that can be used from the age of 5 (e.g., Deep Heat range) or 6 years (e.g., Radian B Muscle Rub). They have no drug interactions, and side effects are localized to excessive irritation at the site of application. Most products contain two or more compounds, although most contain nicotinates, salicylates or both. Other compounds in rubefacients include menthol, camphor, capsaicin and turpentine oil. They can be used in all patient groups.

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Shoulder pain

Background

The shoulder provides the greatest range of motion of any joint. It is a very mobile and complex interconnected structure (Fig. 10.3). Patients present with pain, stiffness or weakness that can affect their ability to work or carry out daily activities and can cause substantial disability.

Prevalence and epidemiology

The prevalence of shoulder-related problems is uncertain, although estimates range from 4% to 20%, with rotator cuff syndrome accounting for up to 70% of shoulder problems. A high proportion of acute problems develop into chronic shoulder pain (>6 months) with up to 50% of people experiencing pain 6 to 12 months after initial presentation.

Aetiology

Most shoulder problems involve the structures of the joint through trauma or overuse. However, causes from elsewhere (e.g., referred pain, rheumatoid disease and malignancy) can also cause shoulder pain.

Arriving at a differential diagnosis

In primary care, a number of causes of shoulder pain are seen, and it is common for more than one pathology to coexist. Table 10.5 highlights the conditions that may be encountered. Asking shoulder-specific questions will help to establish a differential diagnosis (Table 10.6). In addition, the patient can be asked to perform certain arm movements that will allow the range of motion of the shoulder to be determined (Fig. 10.4).

Conditions to eliminate

Most likely causes

Adhesive capsulitis (frozen shoulder)

This refers to a painful shoulder in which there is marked restriction in all the major ranges of motion. Often there is a history of impaired external rotation (e.g., putting on a jacket), but the person may well not remember any event that precipitated symptoms. Pain and stiffness tend to be gradual in onset; pain can be worse at night. Frozen shoulder is said to have three overlapping phases: the pain phase (lasting 2–9 months), stiffness phase (lasting 4–12 months) and resolution phase (lasting >12 months). It is more common in people with diabetes and thyroid disease and people older than the age of 40 years.

Table 10.5
Causes of shoulder pain and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Adhesive capsulitis (frozen shoulder) • Glenohumeral instability • Rotator cuff damage
Likely	• Acromioclavicular joint disorders • Glenohumeral osteoarthritis • Referred neck pain
Unlikely	• Inflammatory arthritis • Polymyalgia rheumatica • Referred pain other than from the neck • Septic arthritis
Very unlikely	• Malignancy (primary, metastases) • Referred pain: myocardial ischaemia

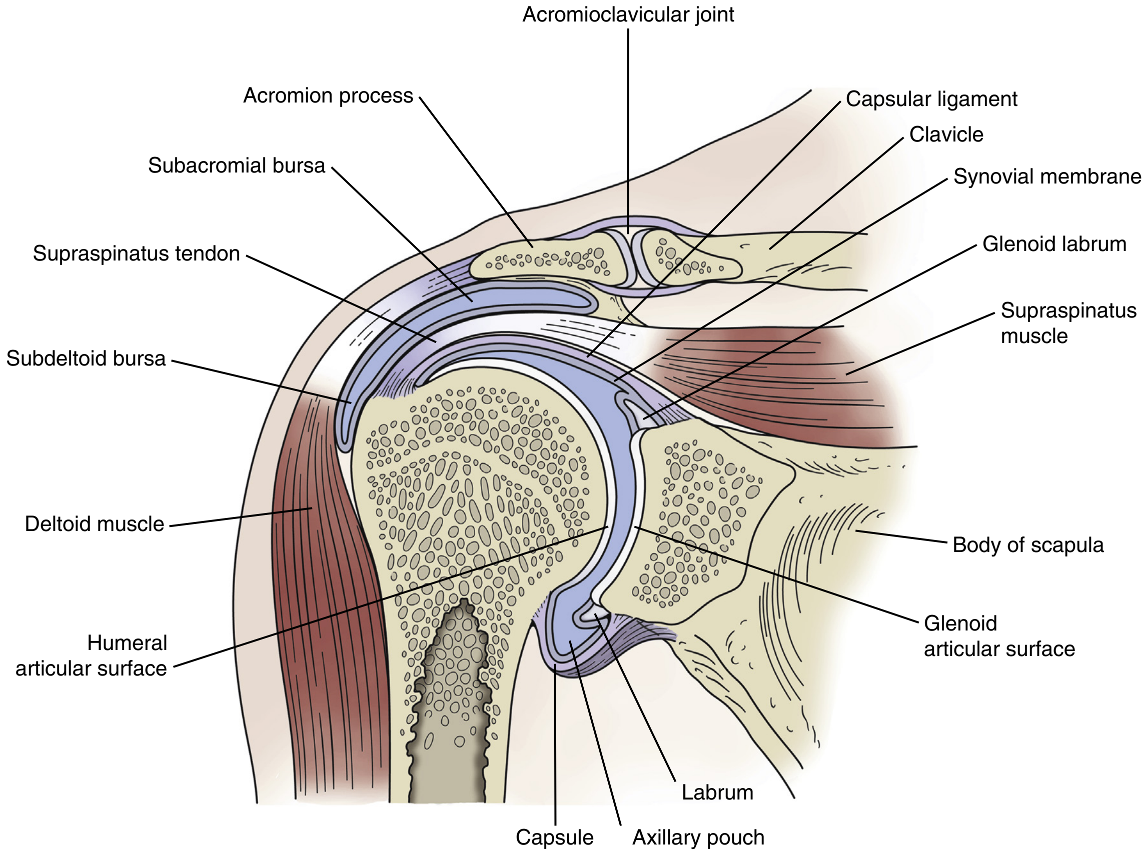
Acromioclavicular joint
Acromion process
Capsular ligament
Clavicle
Subacromial bursa
Synovial membrane
Supraspinatus tendon
Glenoid labrum
Supraspinatus muscle
Subdeltoid bursa
Deltoid muscle
Body of scapula
Glenoid articular surface
Humeral articular surface
Labrum
Capsule
Axillary pouch

Fig. 10.3 Basic shoulder anatomy. (From Azar, F. M., & Beaty, J. H. [2021]. *Campbell's operative orthopaedics* [14th ed.]. Elsevier. Fig. 48.2.)

Table 10.6
Specific questions to ask the patient: Shoulder pain

Question	Relevance
Pain onset	• Acute: suggests trauma, septic arthritis, polymyalgia rheumatica • Gradual: suggests frozen shoulder, arthritic conditions, malignancy
Pain location	• Radiation: suggests rotator cuff damage
When pain experienced	• Night pain: suggests frozen shoulder, rotator cuff damage, malignancy
Age	• Younger than 40 years: suggests glenohumeral instability or mild rotator cuff disease • Older than 40 years: suggests rotator cuff disease, frozen shoulder, arthritic conditions, polymyalgia rheumatica
Associated symptoms	• Fatigue: suggests polymyalgia rheumatica • Fever: suggests septic arthritis, polymyalgia rheumatica • Other joints affected: suggests arthritic conditions, polymyalgia rheumatica
Range of motion (functional impairment)	• Marked decrease: suggests frozen shoulder • Limited decrease: suggests glenohumeral instability or glenohumeral arthritis, but with rotator cuff injury, this tends to be limited to overhead activities
Lifestyle and occupation	• Sports: suggests glenohumeral instability, rotator cuff, acromioclavicular joint disorder • Occupation: suggests rotator cuff damage

Glenohumeral instability

The glenohumeral joint has the highest range of motion of the human body and therefore is inherently unstable. This instability leads to disorders, including dislocation and subluxation. The patients are usually younger than 40 years and have a history of dislocation or subluxation events, which are often associated with

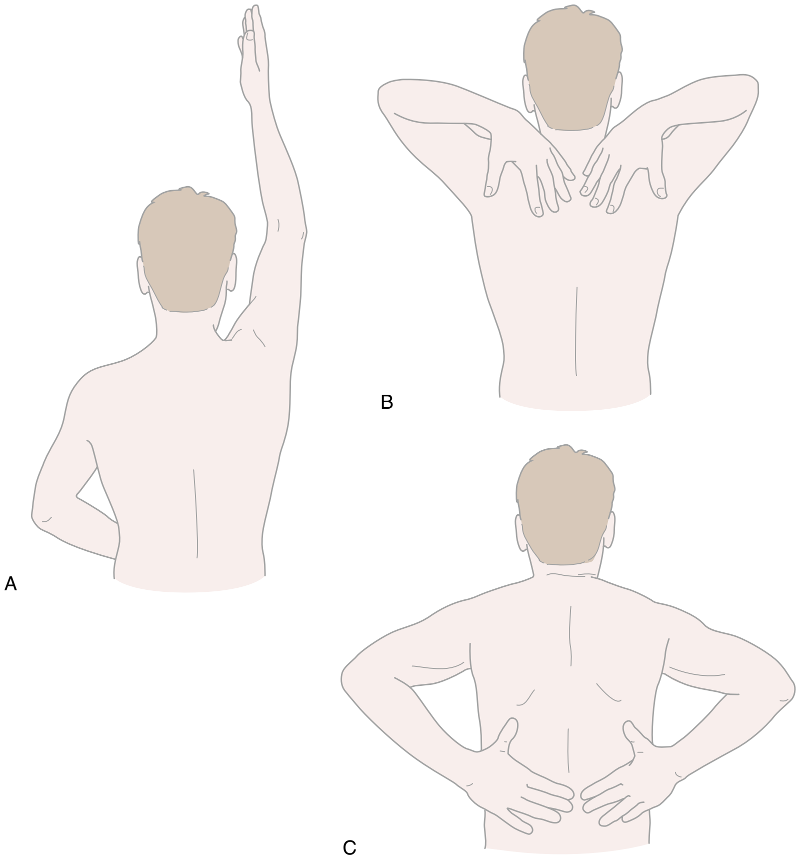

Fig. 10.4 Determining the shoulder's range of motion. (A) Ask the patient to raise the arm, as if going to ask a question at school. (B) Ask the patient to touch the back of the neck with both hands. (C) Ask the patient to touch the back of the scapulae with both hands.

collision or overhead sports. Symptoms include pain, weakness and reduced arm movement that can interfere with daily living. A positive apprehension test result is consistent with the diagnosis.

Rotator cuff damage

The rotator cuff refers to the combined tendons of the scapula muscles that hold the head of the humerus in place. Rubbing of these tendons causes pain. Typically, the patients are older than 40 years of age and complain of dull aching pain in the top and side of the arm with radiation no farther than the elbow. Symptoms can interfere with daily activities, such as raising the arm or doing overhead activities. Pain is often worse at night, and resisted movements are painful. An occupational history may reveal heavy lifting or repetitive movements, especially above shoulder level.

Likely causes

Acromioclavicular joint disorders

These are usually secondary to trauma, so a history of an injury to the joint or performing certain activities (e.g., weightlifting) is consistent with the diagnosis. Pain, tenderness and occasionally swelling are localized to the lateral tip of the shoulder. A cross-body adduction test induces pain.

Glenohumeral osteoarthritis

Glenohumeral osteoarthritis usually presents as progressive deep joint pain and loss of motion in patients older than 60 years of age. A history of arthritis and previous shoulder surgery are known risk factors.

Referred neck pain

Typically, there are pain, stiffness and tenderness of the lower neck and at the top of the scapular. Pain tends not to worsen with movement of the shoulder. Weakness and numbness or abnormal sensations in the shoulder and arms can also be experienced.

Unlikely causes

Inflammatory arthritis

This typically affects the small joints of the hands and feet but can also affect other joints such as the shoulder. Pain, swelling and stiffness of the joint are usual. Symptoms are symmetrical.

Polymyalgia rheumatica

The typical symptoms are aching and stiffness about the upper arms or shoulders, neck and hips. Symptoms develop quickly and are worse in the morning. It is mostly seen in those older than the age of 50 years. Other symptoms that may be experienced are fatigue, fever and loss of appetite. It rarely causes swollen joints.

Referred pain other than from the neck

Usually, pain is not influenced by shoulder movements. Examples of referred pain include gallbladder symptoms in which pain may refer to the right shoulder; elbow pain, particularly epicondylitis, may refer upwards to the shoulder.

Septic arthritis

Sudden onset of pain in one joint, which can be severe, that is accompanied with swelling and skin reddening or heat. Constitutional symptoms and fever are also usually present.

Very unlikely causes

Malignancy (primary, metastases)

Malignancy should be suspected when persistent pain is not relieved by routine measures and steadily gets worse over time. Night pain is also seen. As with other cancers, unexplained weight loss, loss of appetite and fatigue can be observed.

Referred pain: Myocardial ischaemia

Typically, a heart attack will be sudden onset chest pain, feeling sick, sweating, shortness of breath, anxiety and pain that may spread to the jaw, neck, shoulder and arm.

Red flags indicative of referral: Shoulder pain

Reason for referral	Why referring	Timeframe for referral
• Any mass or swelling • Progressively worsening pain lasting more than six months	• May suggest tumour	• Urgent referral to assess the need to be placed on 2-week cancer referral pathway
• Fever or systemically ill	• May suggest infection, septic arthritis or polymyalgia rheumatica	• Same-day referral
• Acute disabling pain following trauma	• Suggests acute rotator cuff tear	• As soon as practicable
• Referred pain	• Suggests pathology not involving the shoulder	

Evidence base for over-the-counter medication and practical prescribing and product selection

Analgesia, physiotherapy or both form the mainstay of treatment for all common forms of shoulder injury. Paracetamol should be tried first, but if it is ineffective, then NSAIDs or codeine should be tried. Patients should be advised to continue to perform normal activities when possible but told to avoid activities that precipitate symptoms. If physiotherapy and analgesia fail to control symptoms, then corticosteroid injection should be considered.

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Elbow pain

Background

Elbow pain may be caused by disorders involving the joint itself, the surrounding soft tissue structures or a referred source. Joint and soft tissue structures that are common sources of pain include the epicondyles and their tendon attachments (medial and lateral); the olecranon bursa; and the radial, median and ulnar nerves (Fig. 10.5). Referred pain most commonly arises from the shoulder. The location and quality of elbow pain can generally localize the injury to one of the four anatomic regions: anterior, medial, lateral or posterior.

Prevalence and epidemiology

Community pharmacists are only likely to see three elbow problems—tennis elbow (lateral epicondylitis), student's elbow (bursitis) and golfer's elbow (medial epicondylitis). Tennis elbow is the most likely cause of elbow pain; it is seven times more common than golfer's elbow.

Aetiology

Elbow problems are usually the result of trauma through overuse or injury and involve tears of tendons and ligaments or inflammation of bursae.

Arriving at a differential diagnosis

Although only a limited number of elbow problems are likely to be seen by pharmacists, other conditions also need to be considered (Table 10.7). Questions centred on the onset of pain, what the patient was doing when the pain started and the type and frequency of athletic and occupational activities should be asked (Table 10.8).

Clinical features of most likely causes of elbow pain

Student's elbow (olecranon bursitis)

This is a common cause of posterior elbow pain, swelling and redness. Swelling is usually the first symptom experienced. Fever is

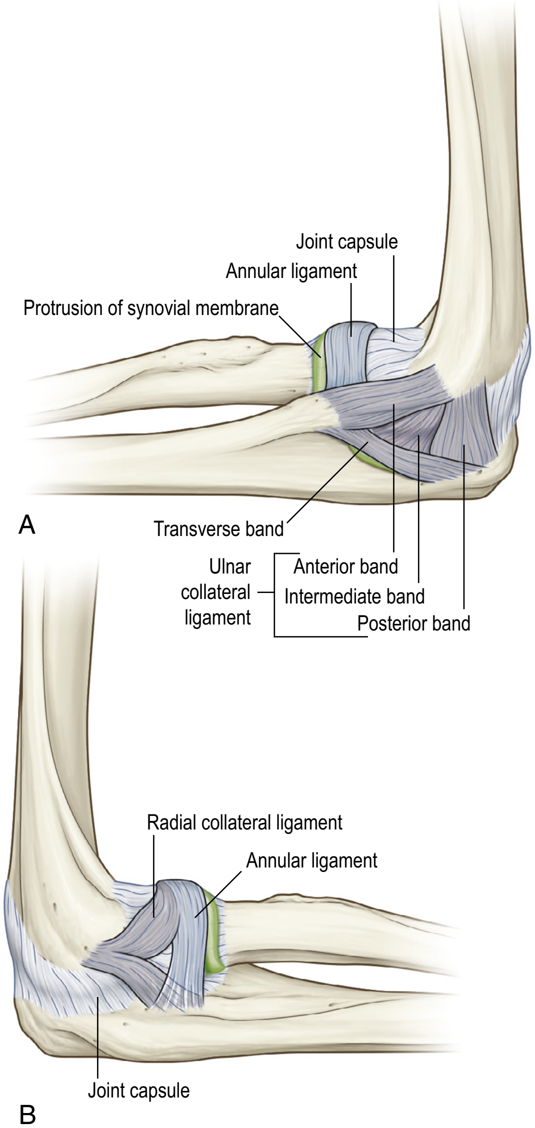

Fig. 10.5 Basic elbow anatomy. (From *Anatomy and Human Movement: Structure and Function*, Eighth Edition, 2025.)

also common. It usually occurs through minor trauma either by repeated elbow movements (e.g., sport movements involving raising the arm above the head when throwing objects) or a one-off injury via a blow to the back of the elbow.

Tennis elbow (lateral epicondylitis)

Associated with muscle overuse through repetitive or strenuous activity, tennis elbow is characterized by pain and tenderness felt over the outer aspect of the elbow joint, which may travel down the forearm. The patient should have a history of gradually increasing pain and tenderness. Pain may be constant but is worse when using the arm. Symptoms are slow to resolve and can last months. Physical examination tests such as the Cozen's and Mill's tests can be performed to help confirm a diagnosis.

Table 10.7
Causes of elbow pain and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Student's elbow (olecranon bursitis) • Tennis elbow (lateral epicondylitis)
Likely	• Biceps tendinopathy • Cubital tunnel syndrome • Golfer's elbow (medial epicondylitis) • Ulnar collateral ligament injury
Unlikely	• Osteoarthritis • Radial tunnel syndrome • Rheumatoid arthritis • Triceps tendinopathy
Very unlikely	• Gout

Conditions to eliminate

Likely causes

Biceps tendinopathy

This is a relatively common source of pain in the anterior elbow. It presents with insidious and vague elbow pain, especially with resisted flexion (e.g., performing a dumbbell curl).

Cubital tunnel syndrome

Patients have medial elbow pain with repetitive activity. The pain is usually associated with numbness and tingling in the ulnar border of the forearm and hand and in the ring and little fingers. Over time weakness of the muscles of the hand may develop. Patients may experience nighttime pain.

Golfer's elbow (medial epicondylitis)

This is a repetitive strain injury caused by overuse of the forearm muscles and can happen with small repetitive movements, such as typing and using a computer mouse, or with strenuous activities. Pain and localized tenderness, which is insidious in onset, is observed around the inside bony part of the elbow and may be felt into the forearm. This can lead to difficulties with gripping and twisting movements. Approximately 60% of patients with medial epicondylitis have concomitant ulnar neuropathy.

Ulnar collateral ligament injury

Ulnar collateral ligament injuries commonly occur in athletes participating in sports that involve overhead throwing. Patients with an acute ulnar collateral ligament injury usually report the sensation of a pop followed by the immediate onset of pain and bruising around the medial elbow.

Unlikely causes

Osteoarthritis

Typically, osteoarthritis is associated with joints other than the elbow. However, if the elbow is affected, the patient may experience

Table 10.8
Specific questions to ask the patient: Elbow pain

Question	Relevance
Onset of pain	Sudden: suggests ulnar collateral ligament injury, gout Gradual or progressive: suggests osteoarthritis, tennis or golfer's elbow, biceps tendinopathy
Nature of pain	Bilateral with stiffness: suggests inflammatory arthritis Unilateral with stiffness: suggests osteoarthritis
Where is the pain	Outer elbow: suggests tennis elbow Inner elbow: suggests golfer's elbow, cubital tunnel syndrome, ulnar collateral ligament injury Front (anterior): suggest biceps tendinopathy Back (posterior): suggests triceps tendinopathy, student's elbow Radiation: suggests tennis or golfer's elbow Forearm: suggests radial tunnel syndrome
What worsens or improves symptoms	Pain worsening with gripping activities: suggests medial epicondylitis
Associated symptoms	Swelling: suggests student's elbow Numbness or tingling: suggests medial epicondylitis, cubital tunnel syndrome, osteoarthritis, inflammatory arthritis
What precipitated symptoms	Overhead repetitive activities: suggests student's elbow Small repetitive movements: suggests golfer's elbow Sport activities: suggests ulnar collateral ligament injury

gradual onset of pain and limited movement of the joint, meaning it is difficult to fully straighten the elbow. Morning stiffness of the joint is also common.

Radial tunnel syndrome

The superficial branch of the radial nerve can become entrapped, leading to localized tenderness distal (away from) to the lateral epicondyle. Vague pain may be experienced in the forearm, and symptoms are often worse at night. It typically occurs with a history of repetitive forearm movement. Physical examination typically reveals a positive Tinel's sign at the radial tunnel.

Rheumatoid arthritis

Rheumatoid arthritis is much more common in the smaller joints but commonly affects both elbows. Early symptoms tend to be pain on the outer side of the joint which worsens when the forearm is rotated. Swelling and stiffness are also common symptoms.

Triceps tendinopathy

Tendinopathy at the triceps insertion occasionally occurs in weightlifters or industrial workers in whom repetitive elbow extension against resistance is required. Pain is experienced at the posterior elbow with resisted extension and tenderness at the triceps insertion.

Very unlikely causes

Gout

Symptoms are very similar to classical gout experienced in the toe. Patients experience sudden and severe pain associated with swelling, tenderness and skin redness. Acute episodes last a few days but tend to recur months or even years later.

Red flags indicative of referral: Elbow pain

Reason for referral	Why referring	Timeframe for referral
Joint pain with systemic symptoms	Suggests infection or systemic inflammatory disorder	Same-day referral to a GP
Mass or swelling	May suggest tumour	Urgent referral to assess the need to be placed on the 2-week cancer referral pathway
Recent history of trauma	Suggests fracture	Refer to A&E

Evidence base for over-the-counter medication and practical prescribing and product selection

As with shoulder pain, the aims of treatment are to provide relief of symptoms and restore physical function of the elbow. Analgesia, physiotherapy or both form the main stay of treatment for the common forms of elbow injuries. Patients should be advised to continue to perform normal activities but to rest the arm when possible and avoid activities that precipitate symptoms for 6 weeks.

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National Rheumatoid Arthritis Society. https://nras.org.uk/

Wrist pain

Background

Wrist pain is observed in all age groups and has wide ranging aetiology. It can be categorized by location being radial, volar or ulnar, and the pain is classed as acute, subacute or chronic.

Prevalence and epidemiology

Certain groups of people are more likely to have certain types of wrist pain. Fractures are most seen in adolescents. Neuropathies affect adults; typically, carpal tunnel syndrome in those aged between 45 and 65 years and ulnar neuropathies in those older than 35 years, especially males. De Quervain tenosynovitis is more common in females, particularly those who are 30 to 50 years of age, and is also commonly seen in females 6 to 12 months postpartum.

Aetiology

Wrist pain of acute nature results in fractures, ligament tears or sprains. Subacute and chronic pain results from overuse, neurologic or systemic causes.

Arriving at a differential diagnosis

Most cases are caused through acute injury or trauma, although tendon inflammation, nerve entrapment and systemic conditions can also cause wrist pain (Table 10.9). Asking wrist-specific questions helps to establish a differential diagnosis (Table 10.10).

Clinical features of wrist pain

Acute causes

Fracture

The scaphoid is the most fractured carpal bone, and this usually happens after falling onto an outstretched hand. Physical examination may reveal a swollen wrist with tenderness. Swelling of the anatomic snuff box increases the likelihood of a scaphoid facture because the scaphoid is located below the snuffbox.

Joint subluxation

A joint subluxation is a partial dislocation of a joint. It is often the result of acute injury or repetitive action. Symptoms include pain and swelling around the joint, a loss of range of motion, temporary loss of feeling or numbness and joint instability.

Table 10.9
Causes of wrist pain and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Fracture • Ligament tear • Subluxation
Likely	• Nerve entrapment ○ Carpal tunnel syndrome ○ Ulnar nerve entrapment • Ganglion cyst
Unlikely	• De Quervain tenosynovitis (writer's cramp) • Systemic causes ○ Gout ○ Osteoarthritis ○ Rheumatoid arthritis

Ligament tears

As with fractures, acute traumatic injury can damage ligaments of the wrist or hand. Commonly, the triangular fibrocartilage complex is involved. Symptoms include swelling, bruising and difficulty with wrist movements. A positive (increased pain) ulnar fovea sign indicates ligament damage.

Conditions to eliminate

Likely diagnoses

Nerve entrapment

Carpal tunnel syndrome

This is the most common entrapment syndrome affecting the upper extremities. It is more commonly seen in females and in certain occupations, for example, people who work in the sewing, cleaning and packing industries. In addition, certain conditions, such as obesity and diabetes, can increase the risk of developing carpal tunnel syndrome.

It occurs when the median nerve is compressed as it passes through the carpal tunnel. This compression can cause numbness in the thumb and the three middle fingers of the hand. Insidious pain at the wrist is often an early symptom. It can make it hard to grip an object with one or both hands. It also causes pain or numbness in one or both hands, especially at night. Shaking the wrist can relieve the symptoms.

Various tests can be performed to help with the diagnosis, including Phalen's test, Tinel's test and the tourniquet test.

Ulnar neuropathy

This is caused by compression of the ulnar nerve as it passes through the elbow or wrist. Entrapment at the wrist can occur when there is direct long-term pressure on the nerve, which may be caused by injury or swelling of nearby structures. Symptoms first experienced are wrist discomfort and numbness or tingling in the fourth (ring) and fifth (little) fingers. In severe or chronic cases, grip weakness or tenderness in the hand is seen.

Table 10.10
Specific questions to ask the patient: Wrist pain

Question	Relevance
Location of pain	Thumb and middle fingers: suggest carpal tunnel Fourth and fifth fingers: suggests ulnar entrapment Top of the wrist: suggests ganglion cyst Base of thumb: suggests writer's cramp, osteoarthritis
Onset of pain	Acute: suggests trauma such as fracture, ligament damage, gout
Timing of pain	Night pain: suggests carpal tunnel syndrome
Other symptoms	Swelling: suggests acute injuries, gout, inflammatory arthritis Stiffness: suggests arthritic conditions Numbness or tingling: suggests nerve involvement
Exacerbating and relieving factors	Writer's cramp and osteoarthritis aggravated by activity and relieved by rest
Subacute and chronic pain	These injuries may have a history of repetitive wrist movement, either occupationally or recreationally
Risk factors	Repetitive work: suggests carpal tunnel Sports activities: suggests ulnar neuropathy

Ganglion cyst

A ganglion cyst is the most common soft tissue mass in the hand affecting adults. The dorsal wrist (on the back or the upper side of the wrist) is most often affected. In most cases, other than a compressible and moveable mass, there are no symptoms. Occasionally, they can cause pain and tingling in the hand if the cyst presses on a nerve. They often resolve spontaneously.

Unlikely causes

De Quervain tenosynovitis (writer's cramp)

Two major dorsal tendons of the thumb are involved: the extensor pollicis brevis and the abductor pollicis longus. These tendons run in a synovial sheath in the first extensor compartment of the hand. Inflammatory changes in the sheath and tendons result in a tenosynovitis. The typical presentation includes radial wrist pain at the thumb base and into the distal radius (the part of the radius connected to the wrist joint). Aching aggravated by activity and relieved by rest is characteristic. Patients may identify a new or repetitive hand-based activity as the cause.

Physical examination may reveal a minimally swollen wrist with local tenderness and tenderness around the soft tissues of the anatomic snuff box. Thumb motion is invariably painful. A positive Finkelstein test result is confirmatory. The condition is normally self-limiting and generally resolves after 1 year.

Systemic causes

Gout

Gout is classically associated with the big toe; however, it can also affect the elbow, wrist and finger joints. Gout solely affecting the wrist is rare. Symptoms associated with wrist involvement include swelling of the wrist or hand and hotness, redness or tenderness of the affected joint or joints. In acute attacks, symptoms are sudden in onset and acutely painful. The prevalence increases with age.

Osteoarthritis

Osteoarthritis can be seen in the metacarpophalangeal joint of the thumb. It is a very common condition that predominantly affects postmenopausal females. It presents with pain (often likened to toothache) at the base of the thumb, which is activity related, particularly gripping, using taps and doorknobs, unscrewing lids or turning keys. Pain is worse with joint use and is relieved by rest.

Rheumatoid arthritis

Usually, rheumatoid arthritis affects both wrists. There may be prolonged morning stiffness and pain with signs of joint swelling. Pain is also usually worse when the joint is rested or inactive.

Red flags indicative of referral: Wrist pain

Reason for referral	Why referring	Timeframe for referral
Fall directly on to the wrist	Suggests fracture	Refer to A&E
Features of fever, redness and swelling Bone tenderness	Suggests infection or a systemic inflammatory disorder	Same-day referral to a GP
Radiating pain up the arm	Suggests that nerve compression affects higher structures such as the elbow	As soon as practicable

Table 10.11
Using RICE to help manage acute injuries

Rest	- Rest allows immobilization, enhancing healing and reducing blood flow.
Ice	- Ice should be applied while the injury feels warm to the touch. Apply until the skin becomes numb and repeat frequently. This should be done for 48–72 hours. - Bags of frozen peas wrapped in a towel are ideal to use on an injury because they conform to body shape and provide even distribution of cold.
Compression	- A level of compression needs to be applied to help decrease swelling.
Elevation	- Ideally, the injured part should be elevated above the heart to help fluid drain away from the injury.

Evidence base for over-the-counter medication and practical prescribing and product selection

Patients with acute trauma benefit from standard advice following the RICE protocol (Table 10.11). For subacute and chronic problems, mainly neuropathies and tendonitis, treatment consist of the use of splints, analgesia and corticosteroid injections.

Further reading

Shehab, R., & Mirabelli, H. (2013). Evaluation and diagnosis of wrist pain: A case-based approach. *American Family Physician, 87*, 568–573.

Websites

The British Society for Surgery of the hand. https://www.bssh.ac.uk/

Knee pain

Background

The knee is the largest joint in the body and is subject to extreme forces. To help maintain stability, the knee has three main pairs of ligaments—the medial collateral ligament (MCL), which connects the femur to the tibia; the lateral collateral ligament (LCL), which connects the femur to the fibula; and the anterior cruciate ligament, which prevents the tibia from sliding forward on the femur (Fig. 10.6).

Prevalence and epidemiology

It is difficult to establish the prevalence of knee pain, with reported rates ranging widely. However, it is the second most common site of musculoskeletal complaint (after back pain) in adults.

Aetiology

Like other joints, knee pain originates mainly from local problems affecting the joint through trauma or wear but can indicate a systemic cause. Several risk factors are associated with knee pain, including playing sports, work-related activities (e.g., kneeling, heavy lifting), being overweight and increasing age.

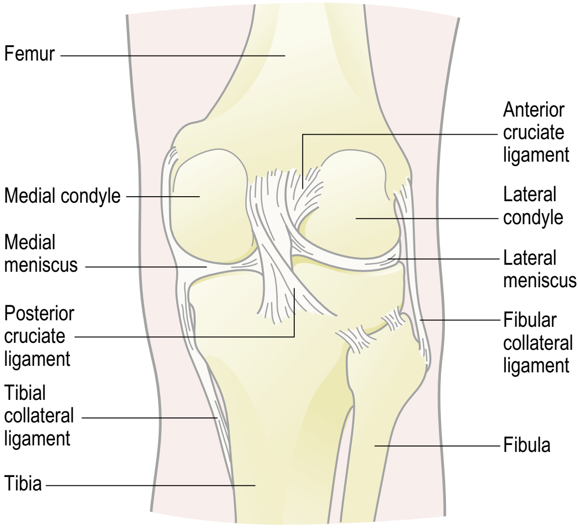
Femur
Anterior cruciate ligament
Medial condyle
Lateral condyle
Medial meniscus
Lateral meniscus
Posterior cruciate ligament
Fibular collateral ligament
Tibial collateral ligament
Fibula
Tibia

Fig. 10.6 Basic knee anatomy (A and B).

Table 10.12
Knee pain associated with children and adolescents

Patellar subluxation
Tibial apophysitis (Osgood-Schlatter lesion): below the knee
Jumper's knee (patellar tendonitis): below the knee
Osteochondritis dissecans: below the knee

Arriving at a differential diagnosis

There are varied and numerous causes of knee pain. A small number of knee problems are associated with children and adolescents (Table 10.12), and knowing if the pain is posterior (back) or anterior (front) is useful in helping to determine the cause (Tables 10.13 and 10.14). The following text only concentrates on conditions that are likely to be seen in a pharmacy (Table 10.15). Asking symptom-specific questions helps to establish a differential diagnosis (Table 10.16).

Likely causes

Baker's cyst

A Baker's cyst results from inflammation of the popliteal bursa and can be precipitated by a knee injury or underlying conditions such

Table 10.13
Anterior knee problems

Outer (lateral) knee pain	Pain at the kneecap	Inner (medial) knee pain	Medial pain below the knee	Pain below the knee
Dislocated patella Iliotibial band syndrome Lateral collateral ligament sprain Lateral meniscus tear	Runner's knee (patellofemoral pain syndrome) Patella Housemaid's knee Bipartite patella	Medial collateral ligament sprain Medial meniscus tear	Medial plica syndrome Pes anserine bursitis	Patellar tendonitis Infrapatellar bursitis

Table 10.14
Posterior knee problems

Behind the knee	Posterolateral knee pain	Posteromedial Knee Pain	Lateral pain below the knee
Baker's cyst Anterior cruciate ligament tear Arthritis Hyperextension Injury Posterior cruciate ligament tear	Biceps femoris tendinopathy	Hamstring tendinopathy	Lateral head of gastrocnemius injury (calf)

Table 10.15
Causes of knee pain and the likelihood of presentation in community pharmacy

Incidence	Cause
Likely	• Baker's cyst • Collateral ligament sprains • Hamstring tendinopathy • Hyperextension injury • Housemaid's knee • Iliotibial band syndrome • Jumper's knee (patellar tendonitis) • Meniscus tears • Osgood-Schlatter disease • Osteoarthritis
Unlikely	• Anterior cruciate ligament tear • Arthritis • Biceps femoris tendinopathy • Dislocated patella • Lateral head of gastrocnemius injury (calf) • Medial plica syndrome • Patellar subluxation • Pes anserine bursitis • Runner's knee (patellofemoral syndrome)
Very unlikely	• Bipartite patella • Infrapatellar bursitis • Osteochondritis dissecans • Posterior cruciate ligament tear

as osteoarthritis or inflammatory arthritis. It tends to occur in people older than the age of 40 years. The first symptom people tend to feel with a Baker's cyst is a small bulge behind the knee, although pain behind the knee with associated tightness and stiffness can be experienced. Pain worsens with activity or when standing for long periods but eases on rest. The cyst is most noticeable on standing and may be tender on palpation. Rarely, it can rupture and present with similar symptoms of a deep vein thrombosis.

Table 10.16
Specific questions to ask the patient: Knee pain

Question	Relevance
History of trauma or injury	• Suggests ligament sprains, hyperextension, meniscus tears
Presence of swelling	• Suggests Baker's cyst, hyperextension, housemaid's knee, meniscus tears
Aggravating and relieving factors	• Worsens on activity and relieved by rest: suggests Baker's cyst, osteoarthritis
Repetitive activities (usually sport)	• Suggests hamstring tendinopathy, housemaid's knee, iliotibial band syndrome, jumper's knee
Radiation of pain away from site	• Into calf: suggests hamstring tendinopathy • Into thigh: suggests iliotibial band syndrome

Collateral ligament sprains

The MCL and LCL are found on the sides of the knee and help to control the side-to-side motion of the knee and brace it against unusual movement. The MCL is on the inside and connects the femur to the tibia, and the LCL is on the outside and connects the femur to the fibula. Injuries to these ligaments are usually caused by a force that pushes the knee sideways, typically through playing direct contact sports such as football. MCL tears tend to occur when a person receives a blow to the outside of the knee, which forces the knee inward. LCL tears occur when a blow occurs to the inside of the knee, forcing the knee outward. MCL injuries are more common than LCL injuries. Pain and swelling are the predominant symptoms. The knee may be unstable depending on the severity of the injury.

Hamstring tendinopathy (tendonitis)

Inflammation and irritation in the tendons on the back of the thigh is a common problem. It can be seen in two areas, either high hamstring tendonitis, in which the tendons attach the hamstring muscles to the hip and pelvis, causing lower buttock or upper thigh pain, or low hamstring tendonitis, in which the tendons attach the hamstring muscles to the back of the knee, causing pain behind the knee that may radiate down the back of the calf. The commonest cause is an overuse injury from repetitive sports activities. Symptoms tend to develop gradually (unlike a hamstring muscle tear) with a dull aching pain or soreness. It can lead to stiffness and a decrease in flexibility that can make normal day-to-day activities such as walking or climbing stairs more difficult.

Hyperextension Injury

A hyperextended knee occurs when the knee joint bends too far backwards and is mostly caused by sporting injuries. Pain tends to be mild to moderate and is accompanied by swelling and bruising. Depending on the severity of injury, swelling or bruising is immediate when damage is severe (e.g., ligaments completely torn) or develops over 24 to 48 hours if damage is minor. The knee joint may feel unstable when standing or walking. Knee stiffness can lead to restricted movement.

Housemaid's knee

Housemaid's knee is caused when the prepatellar bursa gets irritated from friction or pressure and consequently produces extra fluid to protect the knee joint. It is the commonest cause of frontal knee swelling and is generally caused by repetitive kneeling. In addition to swelling, the knee may appear red and warm to touch and be painful. The knee may be difficult to bend.

Iliotibial band syndrome

The iliotibial band is a thick band of fibrous tissue that runs down the outside of the leg from the pelvis to the knee. Iliotibial band syndrome is common in distance runners and cyclists. Lateral knee pain is observed, especially when the heel strikes the floor. The pain may radiate up the thigh.

Jumper's knee (patellar tendonitis)

Pain and tenderness just below the kneecap are seen. Pain tends to come on gradually over time rather than being caused by a specific incident. As the condition progresses and more tears develop, the knee gets gradually more painful. It is associated with repetitive sporting activities such as kicking and jumping. Aching and stiffness are seen after activity.

Meniscus tears

The knee joint contains two menisci, the medial meniscus on the inside and the lateral meniscus on the outside of the knee. They lie between the femur and tibia and act as 'shock absorbers' as well as stabilizing the knee. Meniscus tears occur most often in those who play sport when twisting awkwardly. They can also be degenerative and seen in older people through 'wear and tear'. Immediate symptoms can be experienced as a 'popping' feeling as the meniscus tears. This is followed by pain and swelling. Some people report that their knee 'clicks' or 'locks', and they have an inability to fully bend or extend the knee.

Osgood-Schlatter disease

This is the most common cause of knee pain in adolescents. It occurs during growth spurts in puberty. The patella tendon pulls on the tibia and the growth plate underneath, resulting in a painful bony lump below the kneecap. It is most common in males, particularly those playing lots of sport.

Osteoarthritis

Usually, osteoarthritis of the knee is related to but not caused by aging and is the most common cause of knee pain in people older than the age of 45 years. Pain is usually observed whilst walking or when active (if located in medial and lateral tibiofemoral areas). Other symptoms experienced can include crepitus (clicking or grinding noises), joint stiffness (often in the morning but subsides quickly after waking), knee buckling or knee locking. Osteoarthritis usually develops slowly, and the pain it causes worsens over time.

Red flags indicative of referral: Knee pain

Reason for referral	Why referring	Timeframe for referral
• Fever	• Suggests infection	• Urgent same-day referral
• Severe pain with no apparent cause	• Suggests meniscus tear, torn ligament, fractured bone, dislocated kneecap or malignancy	
• Inability to bear weight, joint instability or cannot fully extend the knee	• Ligament tears like anterior cruciate ligament tears can make the knee unstable	
• Acute onset with swelling and warmth	• Suggests conditions such as arthritis or infection	
• Persistent knee pain that does not improve with conservative treatment	• Suggests conditions such as arthritis or malignancy	

Evidence base for over-the-counter medication and practical Prescribing and product selection

Traumatic knee injuries affect the muscles, ligaments and tendons and benefit from following the RICE protocol after injury (see Table 10.11). Analgesia can be used to control pain and swelling. Specialist assessment is often required, and rehabilitative physiotherapy is needed.

Further reading

Calmbach, W. L., & Hutchens, M. (2003). Evaluation of patients presenting with knee pain: Part II. Differential diagnosis. *American Family Physician, 68*, 917–922.

Foot pain

Background

The foot is made up of 26 bones connected by many joints, muscles, tendons and ligaments, and consequently, many foot problems are seen, although ankle problems tend to be most common (Fig. 10.7). These problems can result in limited movement and mobility.

Prevalence and epidemiology

It is difficult to establish how common foot pain is. Foot pain is most prevalent in older people, affecting approximately one in three people aged over 65 years, and reports suggest that up to 20% of the general population is affected. Associated risk factors include female sex and obesity.

Aetiology

Injury and overuse account for most foot problems that have pain as one of the predominant symptoms. Many problems are associated with sports-related activity or ill-fitting footwear.

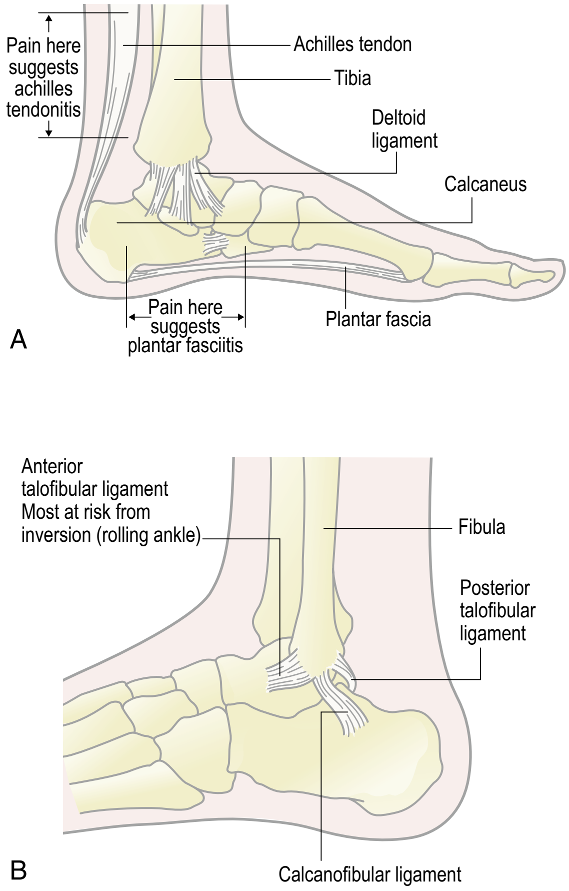
Pain here suggests achilles tendonitis
Achilles tendon
Tibia
Deltoid ligament
Calcaneus
Pain here suggests plantar fasciitis
Plantar fascia
A
Anterior talofibular ligament Most at risk from inversion (rolling ankle)
Fibula
Posterior talofibular ligament
Calcanofibular ligament
B

Fig. 10.7 Basic anatomy of the ankle. (A) Medial view. (B) Lateral view.

Arriving at a differential diagnosis

The foot is anatomically divided into the forefoot, midfoot and hindfoot. This anatomic distinction is useful when considering the problem the patient may have (Table 10.17). Asking symptom-specific questions helps to establish a differential diagnosis (Table 10.18).

Table 10.17
Common foot problems

Forefoot	Midfoot	Hindfoot
• Gout • Hallux valgus • Hallux limitus or rigidus • Hammer, claw and mallet toes • Metatarsalgia • Morton neuroma	• Arthritis • Flat feet • Fractures • Lisfranc injury • Plantar fasciitis	• Achilles tendonitis • Ankle sprain • Fracture • Haglund deformity • Heel spurs • Plantar fasciitis • Retrocalcaneal bursitis • Sever disease • Tarsal tunnel syndrome

Table 10.18
Specific questions to ask the patient: Foot pain

Question	Relevance
Acute vs chronic	• Acute: suggests traumatic causes, gout
Nature of pain	• Point tenderness: suggests fracture, retrocalcaneal bursitis
Swelling	• Suggests acute trauma, arthritis, Haglund deformity, heel spur, retrocalcaneal bursitis, Sever disease, flat feet, gout, bunion
Other symptoms	• Night pain: suggests jogger's foot • Burning or tingling: suggests flat feet, Morton neuroma
What precipitates symptoms	• Running: suggests Achilles injury, • Ill-fitting footwear: suggests retrocalcaneal bursitis, bunion, toe deformities • Sports activities: suggests Sever disease • Weight bearing: suggests acute trauma, jogger's foot, Lisfranc injury
Aggravating and relieving factors	• Pain on walking: suggests heel spur, plantar fasciitis, metatarsalgia • Decreased pain: removal of footwear suggests jogger's foot
Radiation away from site	• To calf: suggests Achilles injury

Common hindfoot conditions

Achilles tendonitis and Achilles tendon rupture

Achilles tendonitis most commonly occurs in runners who have suddenly increased the intensity or duration of their runs. Pain typically begins as a mild ache across the heel with pain radiating up the calf when standing on tip toes. If the Achilles ruptures, there is immediate sharp pain, which can be associated with swelling and an inability to bear weight on the leg.

Ankle sprains

Ankle sprains are common injuries in all populations and are the most prevalent sports-related problem. Three sets of ligaments provide stability to the joint—the deltoid, lateral collateral and syndesmosis—although almost all people present with LCL damage through excessive foot inversion. Pain, swelling and bruising are common and are associated with limited weight bearing. An ankle sprain is usually obvious from the history, although in a small number of cases, the patient may not recall a specific event that triggered symptoms. Most patients walk with a limp because the ankle cannot support their full weight.

Fracture

Calcaneal stress fracture is the second most common stress fracture in the foot. It is caused by repetitive overload to the heel. Patients often report onset of moderate to severe heel pain after an increase in weight-bearing activity or change to a harder walking surface. The pain initially occurs only with activity but often progresses to include pain at rest (i.e., continuous pain). Examination may reveal swelling or ecchymosis. Point tenderness at the fracture site is usually indicative of a calcaneal stress fracture.

Haglund deformity

Haglund deformity is a bony enlargement on the back of the heel. The soft tissue near the Achilles tendon becomes irritated when the bony enlargement rubs against shoes. The symptoms include pain, swelling and redness at the back of the heel accompanied by a noticeable bump. Mild cases usually involve episodic pain after long periods of inactivity.

Heel spur

A heel spur occurs when a calcium deposit grows between the heel and arch of the foot. It can be associated with intermittent or chronic pain, particularly when walking, jogging or running. A sharp pain like a knife in the heel is experienced when standing up in the morning, which is then replaced by a dull ache in the heel throughout the rest of the day. Swelling, inflammation and warmth are seen over the affected area. They are often associated with plantar fasciitis.

Plantar fasciitis

The plantar fascia extends from the calcaneus to the middle phalanges of the toes. Patients experience sharp, localized, often severe pain on the underside of the heel on initiation of activity, for example, with the first weight-bearing steps in the morning and after lengthy periods of rest, although pain is often present continuously. Local tenderness is often observed. It most commonly affects people aged 40 to 60 years and is often seen in runners.

Retrocalcaneal bursitis

Retrocalcaneal bursitis is the inflammation of the bursa located between the calcaneus and the anterior surface of the Achilles tendon. Patients experience pain at the back of the heel, especially when pressure is placed on the heel (e.g., running uphill, standing on tip toes). Tenderness and swelling at the back of the heel may be present. The pain usually gets worse as the day goes on.

Sever disease

Sever disease is the most common cause of heel pain in growing children, especially those who play sports. Pain is experienced at the back of one or both heels. The heel may be red and swollen, and the child may limp.

Tarsal tunnel syndrome (jogger's foot)

This presents as nocturnal burning pain in the heel or heel arch, tingling and numbness, which are made worse by weight bearing such as standing or walking. Patients typically find some relief by removing their shoes, foot elevation and massage.

Common midfoot problems

Arthritis

Midfoot arthritis is characterized by pain, swelling and stiffness. Symptoms usually develop gradually over time. It predominantly affects the tarsometatarsal joints. It occurs because of trauma, osteoarthritis and inflammatory conditions such as rheumatoid or psoriatic arthritis.

Flat feet

Adults can acquire flat feet. This occurs because the tendons that connect to the tibialis posterior muscle become stretched. This is important because this muscle helps to hold the arch of the foot up. Pain or swelling is seen in the instep and ankle. Some patients experience burning, tingling or stabbing pain.

Fractures

Patients experience a dull ache along the affected metatarsal shaft that changes to a sharp ache behind the metatarsal head. It is often seen in patients with a history of increased activity or a change in footwear.

Plantar fasciitis

Given the plantar fascia extends to the toes, pain can extend from the heel to under the foot.

Lisfranc injury

The Lisfranc joint complex includes the bones and ligaments that connect the midfoot and forefoot. Lisfranc injuries tend to damage the cartilage of the midfoot joints. Symptoms involve pain, which is worsened when walking or applying pressure, widespread bruising and swelling on the top of the foot.

Common forefoot problems

Gout

An acute episode of gout has a very sudden onset. Pain is severe, and the joint shows redness and swelling in one or both of the first (big toe) metatarsophalangeal joints.

Hallux valgus (bunion)

This is a common foot deformity, is largely caused by wearing ill-fitting shoes and is much more common in females than males because of wearing high-heeled or narrow-fitting shoes. Pain and swelling are seen over the metatarsophalangeal toe joint. Bunions develop slowly (see Fig. 9.36).

Hallux limitus or rigidus (osteoarthritis)

Osteoarthritis of the big toe is a condition that develops slowly, when the movement of the big toe decreases. In its initial stages (hallux limitus), movement is reduced, but as the condition worsens, the big toe eventually becomes stiff (hallux rigidus).

Hammer, claw and mallet toes

Deformities of the toes are relatively common and generally result from a muscle imbalance which puts pressure on toe tendons and joints, resulting in an abnormal bend in the toe. Poorly fitting shoes that squeeze the toes are often the cause, but it can arise because of nerve damage. The second toe is commonly affected. Differentiation between the different deformities is determined through which toe joint is affected. Hammer toes affect the middle joint (metatarsophalangeal joint), claw toes usually all three joints and mallet toe affect the third joint (distal interphalangeal joint). Because of the toe's being raised, they are often prone to corn and callus formation on the top of the toe.

Metatarsalgia

This is a common foot condition in which one or more of the metatarsal heads (balls of the foot) becomes inflamed generally caused from excessive pressure on the metatarsal bones. Pain is the main symptom and can range from a general dull ache to localized sharp pain. People often say it feels like walking on pebbles.

Morton neuroma

Thickening of the tissue around the nerves between the third and fourth toes produces a sharp burning pain across the ball of the foot. Numbness in the affected toes can sometimes be experienced.

Red flags indicative of referral: Foot pain

Reason for referral	Why referring	Timeframe for referral
Inability to bear weight immediately after ankle injury for four steps	Suggests ankle fracture	Immediate to A&E
Midfoot bone tenderness and/or inability to bear weight immediately after foot injury for four steps	Suggests fracture	
Difficulty in walking or reluctance to bear weight Constant pain	Suggests nerve entrapment	Urgent GP referral
Fever and malaise	Suggests infection	As soon as practicable to a GP
Persistent pain	Suggests less common foot problems such as heel pad syndrome or sinus tarsi syndrome	
Pain affecting other joints	Suggests arthritic conditions	
Forefoot soft tissue mass	Suggests Morton neuroma	
Toe deformity	Requires assessment	

Evidence base for over-the-counter medication and practical prescribing and product selection

Traumatic soft tissue injuries and tendinopathies can be managed with analgesia and conservative measures such as strengthening exercises. If after 6 weeks symptoms have not resolved, then physiotherapy is advocated. If ill-fitting footwear has contributed to symptoms, then these should be avoided. Padded shoe inserts can be helpful to relieve pressure.

Further reading

West, S. G., & Woodburn, J. (1995). Pain in the foot. *BMJ, 310*, 860–864.

Websites

Exercises. https://clinical-pathways.org.uk/sites/default/files/leaflet/Foot%20Pain.pdf

Self-assessment questions

The following questions are intended to supplement the text. Two levels of questions are provided, multiple-choice questions and case studies. The multiple-choice questions are designed to test knowledge and application of knowledge, and the case studies allow this knowledge to be put in context in patient scenarios.

Multiple-choice questions

10.1 Which ONE of the following symptoms is commonly associated with sciatica?

a. Pain that radiates to the thoracic vertebrae
b. Pain that radiates to the quadriceps
c. Pain that radiates below the knee
d. Pain that radiates to the groin
e. Pain that radiates to sacroiliac junction

10.2 A strain is defined as which one of the following?

a. An injury to a ligament
b. An injury to the muscle
c. An injury to a tendon
d. An injury that affects both the muscle and the ligament
e. An injury that affects both the ligament and tendon

10.3 Two days ago, a fit young male (early 20s) played football for the first time in more than a year. He telephones the pharmacy for advice—he cannot walk properly because he has stiff legs. Which ONE of the conditions is he most likely to be experiencing?

a. Shin splint syndrome
b. Thigh strain
c. Hamstring strain
d. Delayed onset muscle soreness
e. Chondromalacia

10.4 Which ONE of the following anatomic structures attaches bone to muscle?

a. Ligament
b. Tendon
c. Bursae
d. Cartilage
e. Fibrous tissue

10.5 Crepitus of the knee is a common symptom. Which ONE of the following conditions is least likely to be observed?

a. Bursitis
b. Osgood-Schlatter disease
c. Osteoarthritis
d. Rheumatoid arthritis
e. Patellar dysfunction

10.6 A 37-year-old male has recently taken up running to lose weight. He develops a sudden, persistent inferior heel pain radiating to the medial arch. Which ONE of the following is the most likely diagnosis?

a. Calcaneal stress fracture
b. Jogger's foot
c. Lisfranc injury
d. Morton's neuroma
e. Plantar fasciitis

10.7 Which ONE of the following conditions is most likely to present with systemic symptoms?

a. Rheumatoid arthritis
b. Heel spur
c. Osteomyelitis
d. Retrocalcaneal bursitis
e. Tumour

10.8 Which ONE of the following causes of shoulder pain is least associated with constitutional symptoms?

a. Glenohumeral osteoarthritis
b. Inflammatory arthritis
c. Malignancy
d. Polymyalgia rheumatica
e. Septic arthritis

10.9 Which ONE of the following symptoms is most associated with carpal tunnel syndrome?

a. Finger stiffness
b. Hand tremors
c. Numbness in the little finger
d. Numbness in the thumb
e. Sweaty palms

10.10 In which ONE of the following conditions is pain most likely to disturb sleep?

a. Rotator cuff syndrome
b. Frozen shoulder
c. Lateral epicondylitis (tennis elbow)
d. Medial epicondylitis (golfer's elbow)
e. Housemaid's knee

Questions 10.11 to 10.18 concern the following conditions:

A. Lateral epicondylitis
B. Medial epicondylitis
C. Rotator cuff syndrome
D. Bursitis
E. Plantar fasciitis
F. Chondromalacia
G. Calcaneal stress fracture
H. Sciatica

Select, from A to H, which symptom is most associated with:

10.11 Radiating pain
10.12 Pain when sedentary
10.13 Decreased range of motion
10.14 Swelling
10.15 Pain over the outer elbow
10.16 Repetitive overhead activity
10.17 Point tenderness around the inside bony part of the elbow
10.18 Trauma

Questions 10.19 to 10.25 concern the following medicines:

A. Paracetamol
B. Aspirin
C. Naproxen
D. Ibuprofen
E. Diclofenac
F. Caffeine
G. Codeine
H. White willow bark

Select, from A to H, which of the above medicines:

10.19 Is only available topically
10.20 Is the safest analgesia for pregnant females
10.21 Has a stimulant effect
10.22 Should be used first in shoulder pain
10.23 Has least evidence of a pain killing effect
10.24 Is only available OTC as a combination product
10.25 Is associated with constipation as a side effect

Answers

10.1 Answer: c

Rationale: Sciatica is associated with referred pain that moves away to the lower extremities from the lumbar and sacral vertebrae. This means options a, d and e are incorrect; b or c could be correct because the pain is described as moving down the leg. Typically, this extends to the foot, and on this basis, c is correct.

10.2 Answer: b

Rationale: Strains relate to muscles; therefore, options a, c and e can be eliminated. These leaves b and d as viable options. However, strains involve tearing of muscle fibres only, so b is the correct answer.

10.3 Answer: d

Rationale: People who take part in unaccustomed physical activity can experience acute pain. Shin splint syndrome (a) and chondromalacia (e) are more long-term problems and can be ruled out. Strains (b and c) and delayed muscle soreness (d) could be the cause of the person's symptoms. However, if the cause were a strain, the pain would normally be experienced shortly after activity and not after a couple of days.

10.4 Answer: b

Rationale: Fibrous tissue (e) is obviously incorrect. Ligaments (a) bind bones together. Bursae (c) act as cushions in joints. Cartilage (d) is a tissue that helps with structural support.

10.5 Answer: a

Rationale: Friction between the bone and cartilage results in crepitus. This is described as noises such as grinding, creaking, cracking, grating or crunching. Options b to e all involve structures involving bone and cartilage; therefore, option a is the correct answer.

10.6 Answer: e

Rationale: Lisfranc injury (c) is a midfoot problem, and Morton neuroma (d) is a forefoot problem and can be discounted. Calcaneal stress fracture (a) and jogger's foot (b) cause heel pain, but symptoms of medial arch pain and initial worsening of pain when first walking are more suggestive of plantar fasciitis (e).

10.7 Answer: c

Rationale: Heel spur (b) and retrocalcaneal bursitis (d) are associated with trauma rather than systemic illness. Tumour (e) would not show systemic illness. Arthritis (a) could show signs of systemic illness, especially septic arthritis, but rheumatoid arthritis is less likely to exhibit these symptoms. Osteomyelitis (c) shows signs of fever or malaise.

10.8 Answer: a

Rationale: Constitutional symptoms include are typically seen with options b to e. Glenohumeral osteoarthritis is a wear and tear condition and does not show such symptoms.

10.9 Answer: d

Rationale: Numbness is classically associated with neuropathies. We are therefore dealing with either numbness of the little finger (c) or numbness in the thumb (d). In carpal tunnel syndrome, the median nerve is compressed. This compression can cause numbness in the thumb and the three middle fingers of the hand.

10.10 Answer: b

Rationale: Pain is observed in all conditions, and a to d are associated with repetitive actions. Epicondylitis (c and d) are not associated with night pain, and neither is housemaid's knee (e). Rotator cuff and frozen shoulder can wake the patient, but frozen shoulder (b) is the more likely of the two to cause this problem.

10.11 Answer: h

Rationale: Of the options listed, lateral (a) and medial (b) epicondylitis and sciatica (h) are associated with radiating pain, although it is a more prominent symptom in sciatica than epicondylitis.

10.12 Answer: g

Rationale: Most injuries show worsening pain on movement or pressure. Plantar fasciitis (e) and calcaneal stress fracture (g) can present with pain on rest, but plantar fasciitis is less likely to have constant pain on rest.

10.13 Answer: c

Rationale: All conditions cause pain and discomfort that can limit movement to some degree, but very characteristic of rotator cuff syndrome is the person's inability to move the arm over the head and behind the back.

10.14 Answer: d

Rationale: Joint swelling usually is caused by increased fluid in synovial spaces or direct inflammation of local structures. Swelling in joints is often therefore caused by bursae inflammation.

10.15 Answer: a

Rationale: Only options a and b relate to the elbow. In lateral epicondylitis, pain is seen on the outer aspect.

10.16 Answer: c

Rationale: Options d to h are not associated with repetitive actions. Both forms of epicondylitis (a and b) are not usually overhead activities. This only leaves rotator cuff syndrome (c), which is seen with repetitive overhead activities.

10.17 Answer: b

Rationale: In medial epicondylitis, pain is seen on the inner aspect compared with the outer aspect in lateral epicondylitis.

10.18 Answer: g

Rationale: All options other than bursitis (d) and fracture (g) are a result of repeated activity and have slow onset of symptoms. Bursitis tends to develop reasonably quickly but is not as immediate as a fracture.

10.19 Answer: e

Rationale: Diclofenac was available as an OTC oral product until withdrawn because of concerns over rare cardiac side effects, so it is now only available topically under the brand of Voltarol.

10.20 Answer: a

Rationale: Paracetamol has the best safety record of all analgesics.

10.21 Answer: f

Rationale: Options a to e and g all relate to compounds that have proven analgesic efficacy. White willow bark (h) has some (low-quality) evidence of pain relief. Only caffeine has no analgesic effect but does have stimulant effects.

10.22 Answer: a

Rationale: Current guidelines advocate the use of paracetamol. If ineffective, an NSAID or codeine could be tried.

10.23 Answer: f

Rationale: All options other than caffeine (f), codeine (g) and white willow bark (h) have good evidence of efficacy as painkillers. Codeine at high doses (i.e., prescription-only doses) does work but at OTC doses, its pain-killing effect has been called into question. White willow bark (h) appears to have some limited evidence based on small trials. Caffeine has no evidence of a pain-killing effect.

10.24 Answer: g

Rationale: Codeine at prescription-only doses can be given as a single agent, but at OTC doses, it is usually combined with paracetamol (co-codamol).

10.25 Answer: g

Rationale: Oral NSAIDS (c and d) and aspirin (b) tend to cause diarrhea rather than constipation. Topical NSAIDS (e). paracetamol (a) and caffeine (f) tend to be free from side effects. Side effects of white willow bark (h) are largely unknown.

Case studies

CASE STUDY 10.1

Mrs BB, a 69-year-old female, hobbles into your pharmacy, supported by her husband. She has just slipped off the pavement edge and believes she has sprained her ankle.

a. To ascertain if referral is necessary, describe the questions you would ask Mrs BB.

Find out the nature of the pain and its location. It is likely that the anterior talofibular ligament has been damaged. Symptoms that would warrant referral to A&E are if severe pain is present and if Mrs BB is unable to walk unsupported for at least four steps.

You decide that Mrs BB has indeed sprained her ankle, but referral is unnecessary. Mrs BB asks to purchase some OTC analgesia to alleviate her pain. Her regular medication is as follows:

- **Losartan 50 mg od, used to treat hypertension; taken for 10 years**
- **Fybogel sachets, 1 bd prn used to treat constipation; taken for 4 years**
- **Lansoprazole 15 mg od prn, used to treat gastro-oesophageal reflux disease (GORD) associated with hiatus hernia; taken for 5 years.**

b. Which OTC systemic analgesic would be most suitable for Mrs BB?

- *Aspirin can cause GI disturbance; Mrs BB has GORD, so aspirin should not be given.*
- *Ibuprofen: NSAIDs can cause fluid retention, and Mrs BB has hypertension. However, this is unlikely to be clinically significant, especially if NSAIDs are recommended for only a few days. Like aspirin, ibuprofen can cause GI disturbances and bleeds in older adults. Although both aspirin and NSAIDs have an antiinflammatory action, they are best avoided for Mrs BB.*
- *Paracetamol (with or without codeine) could be offered, but the analgesic effect of codeine is questionable, and the codeine content is likely to worsen her already existing constipation. This leaves paracetamol as the medicine of choice for Mrs BB.*

Mrs BB asks if she should also use a cream on her ankle.

c. Describe which would be suitable to recommend to Mrs BB.

Rubefacients *contain essential oils, salicylates, nicotinates, capsicum, camphor, turpentine and menthol. Evidence is lacking about their efficacy in decreasing pain, but they help in masking pain symptoms. These could be recommended to Mrs BB but ideally recommend a product with no salicylate present because there is a low risk of systemic absorption and gastric irritation.* ***Topical NSAIDs:*** *Relatively low doses reach the bloodstream and therefore less risk of GI problems than with systemic NSAIDs. Use of topical NSAIDs is unlikely to cause side effects if used for short periods of time (5–10 days) and could be given to Mrs BB even though she has GORD. However, she should be told that if she experiences any indigestion-type symptoms, she should stop using the product.*

CASE STUDY 10.2

Mr JD, a 47-year-old male, asks you for something for low back pain. He tells you that the pain came on a couple of days ago, and he describes the pain as a dull ache across the bottom of his back. He says he is normally fit and healthy.

a. State what the problem representation would be for this patient.

An adult male who is otherwise medically fit presents with a 2-day history of acute diffuse lower back pain.

b. Based on the problem representation, what would be your hypotheses as to the cause of Mr Patel's cough?

Acute lower back pain

c. What further questions could you ask to help confirm your thinking?

Does the pain radiate? Expect this to be negative.

What triggered the pain? Expect that they could recall something.

You find out the pain is also felt at the top of his buttocks, but he cannot remember doing anything to precipitate it.

This seems to not fit with acute low back pain but points toward sciatica.

d. What symptoms should be checked to rule out red flags with Mr JD?

Numbness or weakness

Systemic symptoms

Chapter 11

Paediatrics

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Background

Several problems are encountered much more frequently in children than the rest of the population; it is these problems that this chapter focuses on. A small number of conditions that affect all age groups but are often associated with children are not included (e.g., middle ear infection). These conditions are covered in other chapters and, when appropriate, are cross-referenced in the relevant sections in the text.

History taking

In most cases, pharmacists are heavily dependent on getting details about the child's problem from their parents or an adult responsible for the child's welfare. Parents know when their child is not well, and asking the parent about the child's general health helps to determine how poorly the child is. The major problem faced by all healthcare professionals is the difficulty in gaining an accurate history of the presenting complaint. If the child can be asked questions, they often have to be posed in either closed or leading formats to elicit information.

As a rule of thumb, children who are acting normally and appear generally well often do not need to see a doctor and can be managed by a pharmacist. Those who are visibly unwell may be best assessed by a general practitioner (GP).

Head lice

Background

Humans act as hosts to three species of lice, *Pediculus capitis* (head lice), *Pediculus corporis* (body lice) and *Pediculus pubis* (pubic lice). Only head lice are discussed in this section.

Prevalence and epidemiology

Head lice are most prevalent in children aged 4 to 11 years, especially females. Studies conducted in schools show wide variation of current lice infestation, ranging from 4% to 20% of pupils. Head lice can occur at any time and do not show any seasonal variation. Most parents have experienced a child who has head lice or received letters from school alerting parents to a head lice infestation in the school.

Aetiology

Head lice can only be transmitted by head-to-head contact. Fleeting contact is insufficient for lice to be transferred between heads. After transmission, lice begin to reproduce; an adult louse lives for approximately 1 month. Throughout this time, the female lice lay several eggs at the base of a hair shaft each night. Eggs hatch after 7 to 10 days, leaving the egg cases attached to the hair shafts (known as nits). While maturing to adulthood, the young lice (the nymph) undergo three moults. Shortly after maturing, female lice are sexually mature and able to mate.

Arriving at a differential diagnosis

Most parents diagnose head lice themselves or are concerned that their child has head lice because of a recent local outbreak at school. Occasionally, parents will also want to buy products to prevent their child contracting head lice. It is the role of the pharmacist to confirm the diagnosis by the parent and stop inappropriate sales of products. It should also be remembered that an itching scalp in a child is not always caused by head lice.

Clinical features of head lice

Observation of live lice is diagnostic. They are commonly found in the occipital and postauricular areas. Scalp itching is seen in approximately one-third of patients. Itching is caused by an allergic response of the scalp to the saliva of the lice and can take weeks to develop.

Conditions to eliminate

Dandruff

Dandruff can cause irritation and itching of the scalp. However, the scalp is dry and flaky. Skin debris might also be present on clothing.

Seborrhoeic dermatitis

Typically, seborrhoeic dermatitis affects areas other than the scalp, most notably the face. If only scalp involvement is present, the child might complain of severe and persistent dandruff. In infants, the child will have large yellow scales and crusts of the scalp (cradle cap).

Evidence base for over-the-counter medication

Treatment options include insecticides, wet combing and physical agents. All treatments available in the United Kingdom have shown varying degrees of clinical effectiveness, but it is difficult to assess which is most effective because very few comparative trials have been performed, and insecticidal resistance varies from region to region. No treatment is 100% effective, and failure has been linked to poor adherence to each treatment regimen.

Insecticides

Of the treatment approaches, insecticides have been most studied, but only malathion should now be used because all other insecticides show very poor cure rates.

Wet combing

Wet combing is an effective treatment option providing the method is done correctly and conducted at all scheduled times (e.g., four sessions spaced over 2 weeks conducted on days 1, 5, 9 and 13). Cure rates tend to be low when adherence is poor (Hill et al., 2005; Roberts et al., 2005).

Physical agents

Dimeticone is thought to work by coating the lice internally and externally, which leads to disruption in water excretion, causing the gut of the lice to rupture from osmotic stress (Burgess, 2009). A number of trials have investigated its effectiveness, and subsequent review articles have found it to be superior to chemical insecticides (Kolber et al., 2016; Flores-Genuino et al., 2020).

Dimeticone is also available in a much higher concentration (92%) marketed as NYDA. A randomized controlled trial compared the efficacy of a product containing dimeticone 92% with a permethrin 1% lotion. Both products were applied twice, 7 days apart, and the results showed that cure rates on day 9 were 97% with dimeticone and 68% with permethrin, but cure rates were not given for day 14 (Heukelbach et al., 2008).

Isopropyl myristate is another physical insecticide product; it works by blocking the tracheal breathing system and coating the surface of lice with a thin film of fluid (Anonymous, 2009). Evidence of efficacy comes from two trials that compared isopropyl myristate with permethrin. Results found that isopropyl myristate was significantly more effective than permethrin (82% vs 19%). Although these results seem impressive, the comparator drug was permethrin, a product not recommended because of its poor efficacy.

Summary

The treatment used should be driven by individual preference, the patient's medical history and previous exposure to treatment regimens. Wet combing (available as bug-busting kits) is time consuming and requires patient motivation but is helpful in areas of high insecticidal resistance. Insecticides, dimeticone, and isopropyl myristate are simpler to use than bug-busting kits and appear to have higher cure rates. Based on current evidence, physical insecticides should be used as first-line treatment.

Practical prescribing and product selection

Prescribing information relating to medicines for head lice is discussed and summarized in Table 11.1; useful tips relating to patients presenting with head lice are given in the 'Hints and tips' in Box 11.1. All products should be used more than once; chemical insecticides must be repeated 7 days after first application. This is based on expert opinion because the second application is intended to kill nymphs emerging from eggs that have survived the first application. Physical agents should also be reapplied in 7 days' time, and wet combing used every 4 days for at least 2 weeks. All products, except isopropyl myristate, can be used on children older than 6 months. Dimeticone or wet combing is recommended for pregnant and breastfeeding females.

Chemical insecticide

Malathion (Derbac-M liquid)

Derbac-M should be applied to dry hair and left for a minimum of 12 hours before washing it off.

Physical insecticides

Dimeticone 4% lotion and spray (e.g., Hedrin)

Dimeticone 4% lotion is applied to dry hair, ensuring that it is spread evenly from the hair root to the tips. It needs to be left on for a minimum of 8 hours (overnight is preferable) before being washed out with normal shampoo.

Dimeticone 4% gel (e.g., Hedrin Once Spray gel)

This is sprayed directly onto dry hair and spread in the same way as the lotion, but the manufacturer states it only needs to be left on the hair for 15 minutes. Ideally, it should be left on longer like the lotion.

Dimeticone 92% Spray (NYDA)

The hair should be combed with a fine-toothed comb before the spray is applied over the entire head. After at least 30 minutes, the hair needs to be recombed to remove dead lice. After being applied, it should be left on the hair and scalp for 8 hours or overnight and then washed out using shampoo.

Isopropyl myristate in cyclomethicone (Full Marks solution)

This is applied in the same manner as dimeticone lotion. It is recommended for adults and children older than 2 years. Manufacturers state that the solution only has to be applied for 5 minutes before combing through the hair to remove dead lice.

Isopropyl alcohol aerosol and isopropyl myristate (Vamousse)

This is applied in the same manner as dimeticone lotion. It is recommended for adults and children older than 2 years. A minimum of 15 minutes of contact time is recommended.

Table 11.1
Practical prescribing: Summary of head lice medicines

Name of medicine	Use in children	Very common (≥1/10) or common (>1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Malathion	Older than 6 months	None	None	None	OK
Dimeticone					
Isopropyl myristate	Older than 2 years				

HINTS AND TIPS BOX 11.1: HEAD LICE

Who to treat	• Only individuals with an active head lice infestation should be treated.
Where to apply	• Pay particular attention to the areas behind the ears and at the nape of the neck because these areas are where lice are most often found.
Empty eggshells (nits)	• This does not constitute evidence of current infestation This is a common misconception held by the general public, and pharmacists must ensure that parents seeking treatment have observed live lice.
Products for prevention	• No credible evidence exists for any product marketed for prevention.
Combing techniques	Dry combing: 1. Straighten and untangle the dry hair using an ordinary comb. 2. When the hair moves freely, switch to a detection comb. Starting from the back of the head, comb the from the scalp down to the end of the hair. 3. After each stroke, examine the comb for live lice. 4. Continue to comb all the hair in sections until the whole head has been combed. This process can take 5 or more minutes in people with shoulder-length hair. Wet combing: 1. Wash the hair with a normal shampoo. 2. Apply hair conditioner. 3. Repeat steps 1–4 as for dry combing. 4. Rinse out the conditioner. Wet combing is more time consuming than dry methods and can take up to 10–15 minutes.
Checking treatment success (i.e., no live lice)	Detection combing should be done: • For single application insecticides: Examine on days 1 and 10. • For insecticides with two applications: Examine on day 1 and after the last day of treatment. • For wet combing: Examine on day 17.
Myths	• Head lice are only associated with dirty hair. • Head lice only affect children. • Children should be kept from attending school.

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Threadworm (pinworm)

Background

Worm infections are extremely common in both the developed and developing worlds. In Western countries, the most common worm infection is threadworm *(Enterobius vermicularis)*, which is a condition that causes inconvenience and embarrassment. Social stigma surrounds the diagnosis of threadworm, with many patients believing that infection implies a lack of hygiene. This belief is unfounded because infection occurs across all social strata. The patient might benefit from reassurance, explaining that the condition is very common and is nothing to be ashamed of or embarrassed about.

Prevalence and epidemiology

Threadworm is the most common helminth infection throughout temperate and developed countries. Threadworm prevalence is difficult to establish because of the high number of people who self-medicate or are asymptomatic. However, UK prevalence rates have been estimated at 20% in the community, increasing to 65% in institutionalized settings. Threadworms are much more common in school and preschool children than adults because of their inattention to good personal hygiene.

Aetiology

Eggs are transmitted to the human host primarily by the faecal–oral route (autoinfection) but also by retroinfection and inhalation. Faecal–oral transmission involves eggs lodging under fingernails, which are then ingested by finger sucking after anal contact. Retroinfection occasionally occurs when larvae hatch on the anal mucosa and migrate back into the sigmoid colon. Finally, threadworm eggs are highly resistant to environmental factors and can easily be transferred to clothing, bed linens and inanimate objects (e.g., toys), resulting in dust-borne infections. After eggs are ingested, duodenal fluid breaks them down and releases larvae, which migrate into the small and large intestines. After mating, the female migrates to the anus, usually at night, where eggs are laid on the perianal skin folds, after which the female dies. After the eggs are laid, they are infective almost immediately. Transmission back into the gut can then take place again via one of three mechanisms outlined, and the cycle is perpetuated.

Arriving at a differential diagnosis

Threadworm diagnosis should be one of the simpler conditions to diagnose because patients present with very specific symptoms.

Clinical features of threadworm

Nighttime perianal itching is the classic presentation (caused by the mucous produced by females when laying eggs). However, patients might experience symptoms ranging from a local tickling sensation to acute pain. Any child with nighttime perianal itching is almost certain to have threadworm. Itching can lead to sleep disturbances, resulting in irritability and tiredness the next day. The diagnosis can be confirmed by observing threadworms on the stool, although they are not always visible.

Complicating factors such as excoriation and secondary bacterial infection of the perianal skin can occur because of persistent scratching. The parent should be asked if the perianal skin is broken or weeping.

Conditions to eliminate

Other worm infections

Roundworm and tapeworm infections are encountered occasionally. These infections are usually contracted abroad when visiting poor and developing countries, with patients experiencing nonspecific abdominal symptoms such as loss of appetite, nausea and altered bowel habit.

Contact irritant dermatitis

Occasionally, dermatitis can cause perianal itching (especially in adults). If there is no recent family history of threadworm or there is no visible sign of threadworm on the faeces, dermatitis is possible.

Red flags indicative of referral: Threadworm

Reason for referral	Why referring	Timeframe for referral
• Medication failure	• Possible misdiagnosis	• As soon as practicable
• Broken perianal skin caused by scratching	• Assessment needed to check for bacterial infection	

Evidence base for over-the-counter medication

Mebendazole is available over-the-counter (OTC) for the treatment of threadworm. There is a large body of evidence to support the effectiveness of mebendazole in roundworm infections, but for other worm infections, including threadworm, cure rates are lower. For threadworm, cure rates between 60% and 82% for single-dose treatment of mebendazole have been reported (Rafi et al., 1997; Sorensen et al., 1996).

Practical prescribing and product selection

Prescribing information relating to mebendazole is summarized in Table 11.2; useful tips relating to patients presenting with threadworm are given in the 'Hints and tips' in Box 11.2.

Table 11.2
Practical prescribing: Summary of medicines for threadworm

Name of medicine	Use in children	Very common (≥1/10) or common (>1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Mebendazole	Older than 2 years	Abdominal pain	Phenytoin and carbamazepine	None	Avoid in pregnancy; OK in breastfeeding

HINTS AND TIPS BOX 11.2: THREADWORM

Who to treat	- Treatment should ideally be given to all family members, not only to the patient with symptoms, because it is likely that other family members will have been infected even though they might not show signs of clinical infection.
Hygiene measures	- Nails should be kept short and clean. Careful washing and nail scrubbing before meals and after each visit to the toilet are essential to prevent autoinfection. - Bed linens and sleepwear should be washed daily for the first few days of treatment. - Underwear should be worn underneath night clothes to prevent scratching. - The person should shower daily, immediately on rising, washing around the anus. - Damp dusting and daily vacuuming are recommended to remove eggs.

Mebendazole (Ovex)

The dose of mebendazole for adults and children older than 2 years is 100 mg (a single tablet or 5 mL of suspension). Young children might prefer to chew the tablet, and it has been formulated to taste of orange (suspension is banana flavoured). A repeated dose 14 days later is often recommended to ensure that worms maturing from ova at the time of the first dose are also eradicated. Side effects include abdominal pain and discomfort. It does interact with cimetidine, increasing mebendazole plasma levels, but this seems to be of little clinical consequence. Phenytoin and carbamazepine decrease mebendazole plasma levels, and the dose of mebendazole may need to be increased. Mebendazole should be avoided in pregnancy because foetal malformations have been reported; however, it appears to be safe in breastfeeding females. Pregnant females should be advised to practice hygiene measures for 6 weeks to break the cycle of infection.

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Colic

Background

There is no universally agreed definition of colic. However, one proposed by Wessel et al. (1954), known as the rule of threes, was widely used. Wessel et al. proposed that an infant could be considered to have colic if the baby cries for more than 3 hours a day for more than 3 days a week for more than 3 weeks. However, the use of this definition is outdated and no longer recommended. The Rome IV criteria are now advocated, which states that colic is usually defined as ‘recurrent and prolonged periods of infant crying, fussing, or irritability reported by caregivers that occur without obvious cause and cannot be prevented or resolved by caregivers’.

Prevalence and epidemiology

Because of no universally accepted definition of colic, its prevalence is difficult to determine, and estimates vary widely from 3% to 40%, depending on which definition is used. Studies reporting lower figures strictly applied Wessel et al.’s criteria, whereas higher figures used wider definitions. It is likely that prevalence falls between the two extremes and affects 10% to 20% of infants.

Aetiology

The cause of colic is poorly understood but seems to be multifactorial. It has been linked to a disorder of the gastrointestinal (GI) tract, where spasmodic contraction of smooth muscle causes pain and discomfort, which might be caused by allergy to cow’s milk, lactose intolerance or inadequate amounts of lactobacilli. It has also been suggested that it might stem from emotional, behavioural and social problems that include underdeveloped parenting skills, inadequate social network, postpartum depression and parental anxiety and stress.

Arriving at a differential diagnosis

It can be difficult to determine whether the crying is normal or excessive because babies cry on average 2 to 3 hours per 24 hours. Colic needs to be differentiated from other conditions that have colic-like symptoms (Table 11.3), and asking a number of

Table 11.3
Specific questions to ask the patient: Colic

Question	Relevance
History of crying	• In colic, excessive crying is not isolated and will have been present for some time. • Acute infections are normally sudden in onset, and the baby will not exhibit a long-standing history of excessive crying.
Aggravating factors	• Infants may cry excessively for reasons other than a medical cause (e.g., hunger, thirst, being too hot or cold, trapped wind). These should be explored as part of your questioning strategy before diagnosing colic.
Weight gain	• Weight gain is normal in colic. • Weight gain maybe poor if GORD or intolerance to milk is the cause.

GORD, Gastro-oesophageal reflux disease.

symptom-specific questions should help to establish a differential diagnosis (Table 11.4).

Clinical features of colic

Colic starts in the first few weeks of life and usually resolves by the age of 3 to 5 months.

Excessive crying and inconsolable crying are obvious clinical features, accompanied by facial flushing and drawing up of the legs. Pain may be mild, merely causing the child to be restless in the evenings, or severe, resulting in rhythmic screaming attacks lasting a few minutes at a time, alternating with equally long quiet periods when the child almost goes to sleep before another attack starts.

Conditions to eliminate

Acute infection

Colic and acute infections of the ear or urinary tract can present with almost identical symptoms. However, in acute infection, the child will show acute onset of crying and have signs of systemic infection such as fever.

Intolerance to cow's milk protein

Colicky pain in infants is sometimes attributable to intolerance to cow's milk protein. Symptoms other than crying may be present and include frequent vomiting, diarrhoea with mucus or blood and poor weight gain.

Gastro-oesophageal reflux disease

Infants frequently have regurgitation that is accompanied by excessive crying, although no causal relationship between gastro-oesophageal reflux disease (GORD) and infant crying is seen. The diagnosis is supported if there are unexplained feeding difficulties or refusal to feed that is associated with failure to gain weight.

Red flags indicative of referral: Colic

Reason for referral	Why referring	Timeframe for referral
• Acute onset crying	• May suggest infection or injury	• Same-day GP referral
• Failure to thrive	• May indicate GORD or intolerance to cow's milk	• As soon as practicable
• Forceful vomiting in babies younger than 2 months old	• Suggests pyloric stenosis	

Evidence base for over-the-counter medication

Parents should be reassured that the child's symptoms will subside over time, that their baby is well and that they are not doing something wrong. Most parents want some form of treatment. Treatment include simethicone, lactase enzymes, low-lactose milk formulas and gripe mixtures. None of these has a credible evidence base.

Simeticone is reported to have antifoaming properties, reducing surface tension and allowing easier elimination of gas from the gut

Table 11.4
Summary of colic and conditions causing colic-like symptoms

Condition	History	Weight gain	Systemic symptoms	Inconsolability	Other symptoms
Colic	Weeks	OK	No	Yes	Facial flushing
Infection	Acute: days, hours	OK	Yes	Possibly	Dependent on cause
GORD	Weeks	Can be poor	No	No	Regurgitation
Intolerance to cow's milk protein	Weeks	Poor	No	No	Vomiting and diarrhoea

GORD, Gastro-oesophageal reflux disease.

Table 11.5
Practical prescribing: Summary of medicines for colic

Name of medicine	Use in children	Very common (≥1/10) or common (>1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Simeticone	Infants and older	None	None	None	Not applicable
Lactase					

by passing flatus or belching. It is widely used yet has very limited evidence of efficacy. Of three trials reported, only one found a small improvement in the number of crying attacks. This trial was small (*n* = 26) and had methodological flaws, so results should be viewed with caution (The Joanne Briggs Institute, 2008).

Lactase breaks down lactose present in milk to glucose and galactose. This reduction in lactose concentration is reported to improve colic symptoms, but four small trials investigating its effect were inconclusive.

Low-lactose formulas should not be recommended because studies conducted to date have been of poor methodologic quality. No trial data exist for gripe mixtures, so they should be avoided.

Summary

Although evidence for simeticone and lactase enzymes is not strong, it seems unreasonable not to let parents try either for a trial period of 1 week if they are finding it difficult to cope. If no response is seen, referral to a doctor or health visitor is advisable. It is worth noting that there is a small body of evidence for the use of probiotics in reducing crying time (Ong et al., 2019).

Practical prescribing and product selection

Prescribing information relating to simethicone and lactase enzymes is discussed and summarized in Table 11.5; useful tips relating to colic are given in the 'Hints and tips' in Box 11.3.

HINTS AND TIPS BOX 11.3: COLIC

Review feeding technique	• Before recommending a product, it is worth checking the feeding technique. Underfeeding the baby can result in excessive sucking and in air being swallowed, leading to colic-like symptoms. Additionally, when bottle feeding, the teat size of the bottle should be checked. When the bottle is turned upside down, the milk should drop slowly from the bottle.
Be alert for signs of postnatal depression	• Excessive crying is associated with higher rates of parental postnatal depression.

Simeticone

Simeticone (e.g., Infacol, Dentinox) is pharmacologically inert; it has no side effects, drug interactions or precautions in its use and can therefore be safely prescribed to all infants. The dose for Infacol is 0.5 to 1.0 mL before feeds, and for Dentinox, it is 2.5 mL taken with the feed.

Lactase enzyme (Colief)

The dose of lactase enzyme (Colief) differs, depending on if the baby is formula or breastfed. When breastfeeding, four drops should be added to a small amount of expressed milk and the baby breastfed as normal; if using an infant formula, the feed should be made up as usual and four drops added to warm, but not hot, formula. If making up the formula in advance, add two drops of Colief and store in the fridge for 4 hours but use it within 12 hours.

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The Breastfeeding Network. https://www.breastfeedingnetwork.org.uk

Unsettled or crying babies. https://www.rch.org.au/clinicalguide/guideline_index/crying_baby_infant_distress/

Atopic dermatitis

Background

Atopic dermatitis is a chronic noninfective inflammatory skin condition characterized by an itchy red rash. It usually starts within the first 6 months of life and predominantly affects young children. Most patients (60–70%) 'grow out' of the condition by their early teens. However, atopic dermatitis can persist into adulthood, when the condition becomes chronic. Atopic dermatitis can impair the quality of life of patients and their families.

Prevalence and epidemiology

The prevalence of atopic dermatitis is unclear. Rates vary from country to country. In the United Kingdom, prevalence rates have been rising, and it now affects 10% to 30% of children. The condition usually presents in infants aged between 2 and 6 months, but it can also occur in older children. Upwards of 60% of children have onset within the first year of life, increasing to 70% to 90% within the first 5 years.

Aetiology

Atopic dermatitis has a strong genetic component, although the precise genetic cause is unknown. Two-thirds of people with the disease have a family history of atopic dermatitis, asthma or hay fever. Atopic dermatitis is present in approximately 80% of children when both parents are affected and in 60% when one parent is affected. A number of environmental factors have been implicated in the development or worsening of the condition and include certain foods (e.g., dairy products), stress, extremes of heat and humidity and irritants such as detergents and chemicals.

Arriving at a differential diagnosis

A typical presentation is an irritable child with dermatitis of varying severity. The child might have had the symptoms for some time, and the parent has often already tried some form of cream to help control the itch and rash. Scratching can lead to broken skin, which can become infected. There is a tendency to have dry sensitive skin, even in those who have outgrown the disease. It can be confused with other rashes that itch (Table 11.6), and asking a number of symptom-specific questions should help to establish a differential diagnosis (Table 11.7).

Clinical features of atopic dermatitis

A typical distribution of atopic dermatitis is illustrated in Fig. 11.1. In babies, facial involvement (the cheeks) is common, along with patchy red scaly lesions on the wrists and hands (Fig. 11.2). In toddlers and older children, the antecubital (in front or at the bend of the elbow), popliteal fossae (behind the knee) and ankles are more commonly involved (Fig. 11.3). Itching is a predominant symptom, which can induce a vicious cycle of scratching, leading to skin damage, which in turn leads to more itching—the so-called itch scratch–itch cycle.

Table 11.6
Causes of rash that can look like atopic dermatitis and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Allergic contact dermatitis • Atopic dermatitis • Seborrhoeic dermatitis
Likely	• Contact dermatitis
Unlikely	• Fungal infection • Psoriasis
Very unlikely	• Scabies

Table 11.7
Specific questions to ask the patient: Atopic dermatitis

Question	Relevance
Itch	• Itch is severe in atopic dermatitis, other forms of dermatitis and scabies. • Itch tends to less severe in fungal infection. • Itch is mild or absent in psoriasis or seborrhoeic dermatitis.
Distribution of rash	• In atopic dermatitis, this varies according to age (see Fig. 11.1) but commonly affects flexures, face and wrists/ • The nappy area is often involved with seborrhoeic dermatitis/ • The trunk and limbs are most affected in fungal infection. • Allergic and contact dermatitis tend to occur at sites of exposure.
Acute vs chronic	• Atopic dermatitis and psoriasis show chronic skin involvement. • Infections present with acute symptoms. • Contact dermatitis presents shortly after exposure.
Family history of atopy	• A positive family history is associated with atopic dermatitis.

To help with diagnosis, criteria-based protocols are available; for example, National Institute for Health and Care Excellence (NICE) guidelines (2007) state that atopic dermatitis is likely if the person has had an itchy skin condition plus three or more of the following:

- Onset before the age of 2 years
- History of dry skin in the past 12 months
- History of eczema in the skin creases (and the cheeks in children younger than 18 months)
- Visible flexural eczema involving the inside elbows or behind knees (or involvement of the cheeks or forehead and outer limbs in children younger than 18 months)
- Personal history of other atopic disease

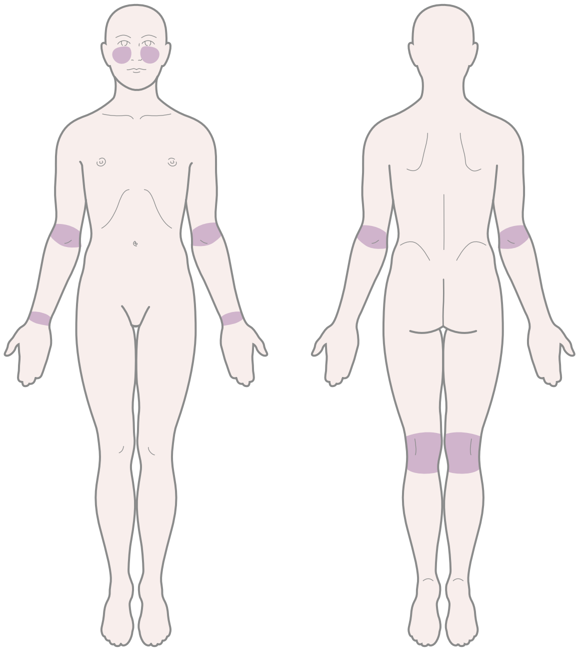

Fig. 11.1 Typical distribution of atopic dermatitis.

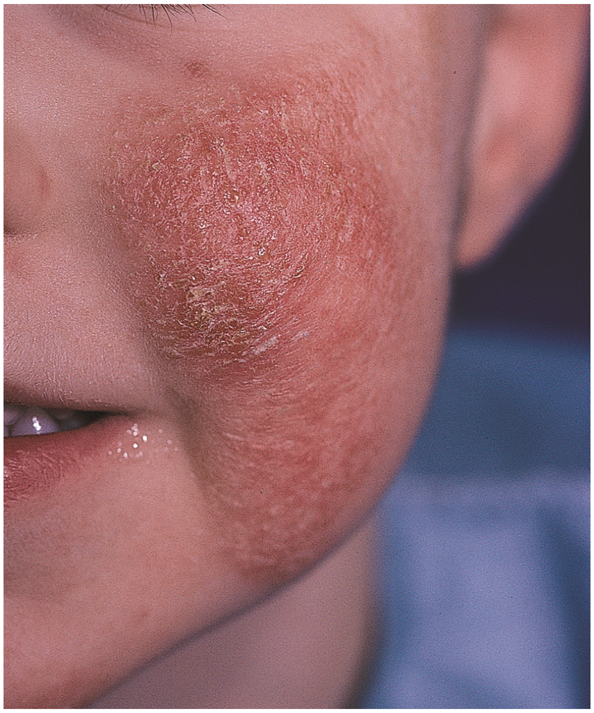

Fig. 11.2 Atopic dermatitis in an infant. (From Zitelli, B. J., & Davis, H. W. [1997]. *Atlas of pediatric physical diagnosis* [3rd ed.]. Mosby.)

Conditions to eliminate

Most likely causes

Allergic contact dermatitis

A red, itchy skin rash can be seen at any site related to exposure. Lesions are associated with exposure to an allergen. Allergic contact dermatitis can be a trigger factor of atopic dermatitis.

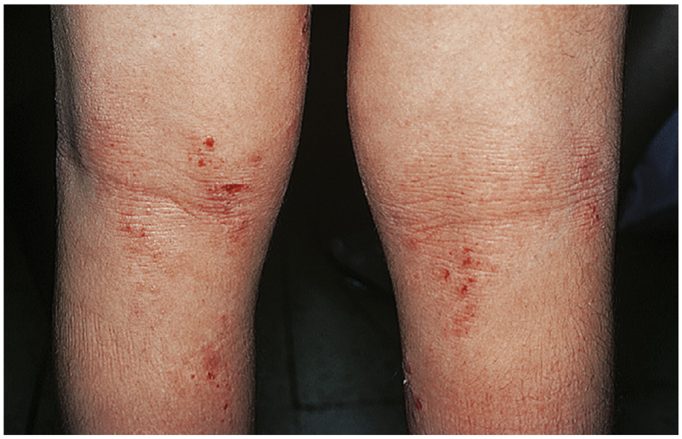

Fig. 11.3 Atopic dermatitis in the popliteal fossa (bend of the knee). (From Gawkrodger, D. J. [2007]. *Dermatology: An illustrated colour text* [4th ed.]. Churchill Livingstone.)

Seborrhoeic dermatitis

Seborrhoeic dermatitis in infants typically occurs in the first 6 months. Itching is generally not present, and there is an absence of a family history. Large yellow greasy scales affect the scalp, face and nappy area (see Fig. 9.13).

Likely cause

Contact dermatitis

This can look like atopic dermatitis, but it is associated with a positive exposure history, rash in area of exposure and absence of family history.

Unlikely causes

Fungal infection

The rash is associated with moderately itchy red rash that can therefore be confused with atopic dermatitis. However, the rash tends to be slightly raised with a well-defined inflamed border at locations, which is unusual with atopic dermatitis (see Fig. 9.20).

Psoriasis

Psoriasis can be mistaken for atopic dermatitis because the rash can occur on parts of the body such as the scalp, elbows and knees that are common locations for atopic dermatitis in older children. However, itch is not as prominent, and the rash is raised and has well-defined boundaries with a silvery-white, scaly appearance (see Fig. 9.3).

Very unlikely cause

Scabies

Atopic dermatitis and scabies can both exhibit severe itch. Rash in scabies can be widespread and affect areas associated with atopic dermatitis. However, children with scabies should not have a history of dry skin or atopy but may show a family history of recent skin rash because of its contagious nature.

Red flags indicative of referral: Atopic dermatitis

Reason for referral	Why referring	Timeframe for referral
• Children with moderate or severe symptoms	• Outside the scope of community pharmacists; the patient probably needs corticosteroid therapy	• As soon as practicable
• Presence of secondary infection (weeping and crusting lesions)	• Potentially needs systemic antibiotics	• Same-day referral to a GP

Evidence base for over-the-counter medication

The mainstay of treatment for atopic dermatitis consists of avoiding potential irritants, managing dry skin, controlling itching and using topical corticosteroids to treat flare-ups. Unfortunately, OTC license restrictions for steroids preclude their use in children.

Avoiding irritants

When practical, factors that worsen dermatitis should be avoided. The use of highly perfumed soaps and detergents should be discouraged and replaced with soap substitutes.

Emollients

It is believed that emollients add moisture to the skin and repair the lipid barrier function while also helping to prevent penetration by irritants and decreasing the need for steroids. Despite a lack of high-quality, randomized controlled trials, emollients are well established as first-line treatment for patients with atopic dermatitis. No trials appear to have addressed whether one emollient is superior to another. Patients might have to try several emollients before finding one that is most effective for their skin.

Antihistamines

There appear to be no clinical trial data on the use of sedative antihistamines for reducing pruritus in those with atopic dermatitis; however, they are often prescribed to children to help with itching. The American Academy of Dermatology guidelines on the treatment of atopic dermatitis report that there is little evidence for the use of antihistamines; however, sedating antihistamines may be useful when there is significant sleep disruption because of itching (Hanifin et al., 2004).

Corticosteroids

A substantial body of evidence exists for corticosteroids in controlling all types of dermatitis, including atopic dermatitis. If the symptoms warrant corticosteroid therapy, usually mild to moderate potency steroids, preferably in an ointment base, should be used, although these need to be prescribed by an independent prescriber or a GP.

Practical prescribing and product selection

Before instigating any treatment, an assessment of the severity should be made (https://www.nice.org.uk/guidance/cg57). If deemed to be mild (areas of dry skin, infrequent itching and small areas of redness), emollients should be given. Prescribing information relating to medicines for atopic dermatitis is discussed and summarized in Table 11.8; useful information regarding emollients is given in the 'Hint and tips' in Box 11.4.

Emollients

A plethora of emollient products are marketed, and which one a patient uses should be dictated by patient response and acceptability. All emollients should be regularly and liberally applied, with no upper limit on how often they can be used. They should be routinely used even when the skin is clear. All are chemically inert and therefore can be safely used from birth upwards.

Table 11.8
Practical prescribing: Summary of medicines for atopic dermatitis

Name of medicine	Use in children	Very common (≥1/10) or common (>1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Emollients	Birth onwards	None	None	None	Not applicable
Antihistamines					
Chlorphenamine	Older than 1 year	Sedation	Increased sedation with opioid analgesics, anxiolytics, hypnotics and antidepressants; however, it is unlikely a child will be taking such medicines	None	Not applicable
Cyproheptadine	Older than 2 years				
Promethazine	Older than 2 years				

HINTS AND TIPS BOX 11.4: ATOPIC DERMATITIS

General self-help	• Avoid scratching. • Keep nails short. • Rub skin with fingers to alleviate itch to minimize skin trauma.
Lanolin-containing emollients	• Emollients that contain lanolin (e.g., Keri Lotion and E45) should be patch tested before use because they are known to cause sensitization.
Applying emollients	• They are best applied when the skin is moist (e.g., during bath times). • Apply as frequently as possible. • Oily emollients tend to be most effective.

Sedating antihistamines

Chlorphenamine (e.g., Piriton Allergy tablets and syrup)

It can be given to children 1 year of age and older (2.5 mL [1 mg] twice daily). For all other age groups, the dosage is every 4 to 6 hours. Children 2 to 5 years of age should take 2.5 mL (1 mg); children 6 to 11 years of age should take 5 mL (2 mg or half a tablet).

Cyproheptadine (Periactin)

Children between the ages of 2 and 6 years should take 2 mg (half a tablet) two or three times a day. For children older than 7 years, the dose is 4 mg (one tablet) two or three times a day.

Promethazine (e.g., Phenergan)

Children between the ages of 2 and 4 years should take 10 mg (5–10 mL) in two divided doses. For those between 5 and 9 years, the dosage is 10 to 20 mg/day in two divided doses.

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Fever

Background

Fever is simply an increase in body temperature above normal. Normal oral temperature is 37°C (98.6°F), plus or minus 1°C, although rectal temperature is about 0.5°C higher, and underarm temperature is 0.5°C lower than oral temperature. During the course of 24 hours, minor fluctuations in temperature are observed. Fever is often classified as being low grade (>38°C) or high grade (>39°C).

In a practice setting, for those younger than 5 years, the best temperature to take is under the arm using an electronic or chemical dot thermometer. Infrared tympanic thermometers are also advocated. Forehead strip thermometers are popular because they are easy to use but should be avoided because they are unreliable.

Prevalence and epidemiology

Fever is a common symptom of many conditions; in children, viral and to a lesser extent bacterial causes are most often implicated. It has been reported that fever is probably the most common reason for a child to be taken to a doctor.

Aetiology

Body temperature is regulated closely because temperature changes can significantly alter cellular functions and, in extreme cases, lead to death. The thermoregulation centre located in the hypothalamus controls the balance between heat production and heat loss. When body temperature reaches its set point (~37°C), mechanisms to lose or conserve heat are activated. When a person has a fever, this suggests that there is some defect in the temperature-regulating control system. In fact, the system is functioning normally but with an adjusted higher set point. This process is complex but involves the production of pyrogens (fever-causing substances) that alter the set point.

Arriving at a differential diagnosis

Establishing fever is usually a subjective perception by the parent that the child feels warm or is off-colour. The importance of the parent’s perception should not be underestimated or dismissed if the child’s temperature has not been taken. Healthcare professionals often place too much value on an empirical figure when in many cases, the look of the child is more important than the height of the fever. Fever is usually a result of infection (Table 11.9) and asking a number of symptom-specific questions helps to establish a differential diagnosis (Table 11.10).

Clinical features of fever

A child with fever is generally irritable, be off his or her food and seek greater parental attention. Other signs that might be seen include facial flushing and shivering.

Table 11.9
Causes of childhood fever and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Upper respiratory tract infections • Urinary tract infection
Likely	• Roseola infantum (sixth disease) • Vaccine reaction
Unlikely	• Glandular fever • Medicine-induced fever • Pneumonia
Very unlikely	• Kawasaki disease • Meningitis • Scarlet fever

Table 11.10
Specific questions to ask the patient: Fever

Question	Relevance
How poorly is the child?	• The parent will know how poorly the child is relative to normal behaviour. A systemically unwell child may require further assessment using tools such as the NICE guidelines 'traffic light' system (https://www.nice.org.uk/guidance/ng143).
Associated symptoms	• Viral upper respiratory tract infections are usually accompanied with one or more symptoms, including cough, cold and sore throat. • If no other symptoms are present, this suggests a bacterial infection, often a urinary tract infection. • Rash suggests infection (see infectious skin rash section).

NICE, National Institute for Health and Care Excellence.

Most likely causes

Upper respiratory tract infections

It is rare for upper respiratory tract infections to present with fever alone. Cough, cold or sore throat is usually present. Treatment can be offered, and referral is generally not needed unless secondary bacterial infection is suspected; earache symptoms might suggest this.

Urinary tract infection

One of the most common causes of fever in children is a urinary tract infection. Often, the child will present only with fever. Other symptoms can be present and include irritability, poor feeding, vomiting or abdominal pain.

Conditions to eliminate

Likely causes

Roseola infantum (sixth disease)

Roseola infantum is probably caused by a neurodermotropic virus and is most prevalent in infants. The onset is with a sudden high-grade fever (40°C) that lasts 3 to 5 days before a macular rash develops on the trunk, which can spread to proximal extremities. The rash will blanch when pressed (Fig. 11.4).

Vaccine reaction

Fever is one of the common side effects associated with childhood vaccinations. A recent history of vaccination plus injection site pain, redness or swelling is typical.

Unlikely causes

Glandular fever

Glandular fever is most seen in young adults rather than children, but any patient who has a long-standing history of fatigue and a low-grade fever should be referred for further evaluation.

Medicine-induced fever

A number of medicines can elevate body temperature and should be considered if no other cause can be determined. Penicillins, cephalosporins, macrolides, tricyclic antidepressants, anticonvulsants and antiinflammatory drugs, when associated with hypersensitivity, have all been associated with increasing temperature.

Pneumonia

Children exhibit cough, chest pain and increased respiration rate. Fever is often but not always present.

Very unlikely causes

Kawasaki disease

Typically, this affects children younger than 5 years of age. Symptoms include fever; swollen cervical glands; red eyes; and redness of the throat, tongue and palms of the hands and feet. A rash usually appears on the chest. The symptoms can come and go over a period of days and weeks. The cause is not known.

Meningitis

Meningitis should be considered in any feverish child who is obviously systemically unwell and exhibits symptoms such as severe headache, photophobia, lethargy, drowsiness and neck stiffness. The classic textbook sign of a nonblanching rash is often seen late in symptom presentation and should not be routinely expected to be seen in children. Further information is provided under the discussion of infectious childhood conditions.

Scarlet fever

Twelve to 48 hours before the rash develops, patients may present with sore throat, headache and low-grade fever. The rash, which is blanching, starts on the abdomen before spreading to the neck, limbs and extremities. The rash has a rough, sandpaper-like texture. Mouth inspection often reveals a 'strawberry tongue' (Fig. 11.5).

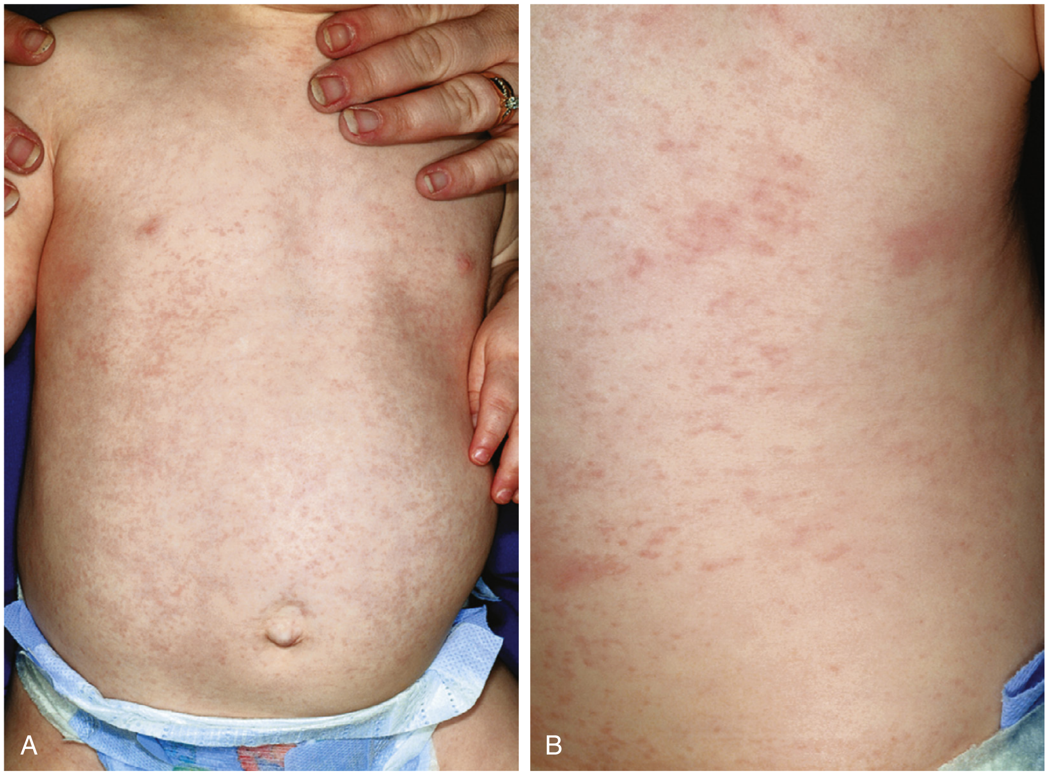

Fig. 11.4 Roseola infantum (A and B). (From Paller A. S., & Mancinin, A. J. [Eds.]. [2006]. *Hurwitz clinical pediatric dermatology* [3rd ed]. Philadelphia, Saunders.)

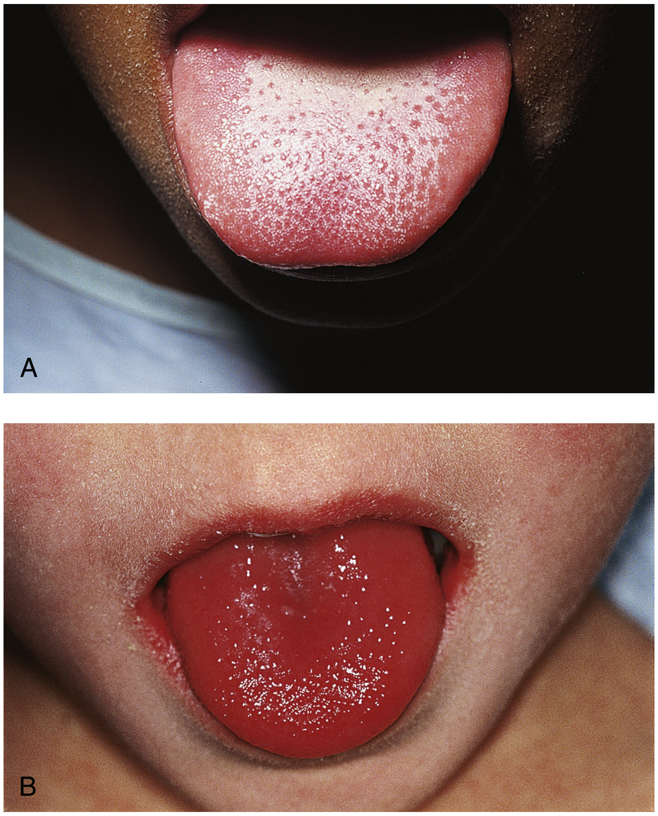

Fig. 11.5 Scarlet fever (A and B). (From *Pediatric dermatology* [2021, 5th ed.].)

Red flags indicative of referral: Fever

Reason for referral	Why referring	Timeframe for referral
Any feverish child younger than 3 months old Fever accompanied with no other symptoms Fever of >5 days' duration Febrile convulsions or seizures	Outside the scope of community pharmacists; the child requires further assessment	Immediate to a GP
Stiff neck Obviously ill child or child who fails to respond to stimuli	Suggests meningitis	Immediate to accident and emergency department (A&E)
Signs of moderate dehydration (e.g., dry mucous membranes, decreased skin turgor, prolonged refill capillary time)	Oral rehydration may be inadequate; intravenous fluids may be needed	

Table 11.11
Practical prescribing: Summary of medicines for fever

Name of medicine	Use in children	Very common (≥1/10) or common (>1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Paracetamol[a]	Older than 3 months	None	None	None	Not applicable
Ibuprofen		GI disturbances		Children with known hypersensitivity to NSAIDs	

[a]Note: Paracetamol from 2 months for postimmunization pyrexia.
GI, Gastrointestinal; *NSAID,* nonsteroidal antiinflammatory drug.

Evidence base for over-the-counter medication

Nonpharmacologic intervention

Children should be told to drink additional fluids to prevent dehydration. Tepid sponging is also often advocated, and two reviews by Meremikwu and Oye-Ita (2002, 2003) considered the effect of physical cooling methods for reducing fever. Conclusions from the reviews were guarded because of the small number of trials but did indicate that tepid sponging helps to reduce fever in children. However, first-line therapy would be to use analgesia.

Pharmacologic Intervention

Paracetamol and ibuprofen are effective in reducing fever, but UK guidelines recommend they should only be used in children who are unwell or distressed. Either could be used as monotherapy and, if the first is not helping, switch to the other. If both appear to be ineffective, consider alternating between the two (Wong et al., 2013).

Practical prescribing and product selection

Prescribing information relating to medicines for fever is discussed and summarized in Table 11.11.

Paracetamol

Paracetamol is available in a number of dosage forms, such as liquid, soluble tablets, sachets and melt tabs. It has no common side effects, does not interact with any medicines and can be safely taken by all children. For all age groups, the maximum number of doses per day is four. The dosing schedule is:

- Ages 3 to 5 months: 120 mg/5 mL at a dose of 2.5 mL
- Ages 6 to 23 months: 120 mg/5 mL at a dose of 5.0 mL
- Ages 2 to 3 years: 120 mg/5 mL at a dose of 7.5 mL
- Ages 4 to 5 years: 120 mg/5 mL at a dose of 10 mL
- Ages 6 to 7 years: 250 mg/5 mL at a dose of 5 mL
- Ages 8 to 9 years: 250 mg/5 mL at a dose of 7.5 mL
- Ages 10 to 11 years: 250 mg/5 mL at a dose of 10 mL

Ibuprofen

Ibuprofen (e.g., Nurofen, Calprofen) can be given to children older than 3 months. Ibuprofen can cause GI side effects, such as nausea and diarrhoea, and interacts with many other medicines, although medicines that interact with ibuprofen are very unlikely to be taken by children. Any child who has previously taken a nonsteroidal antiinflammatory drug (NSAID) and had an allergic reaction to it should avoid ibuprofen.

Doses for ibuprofen, like those for paracetamol, are age dependent. The dosing schedule that follows is taken from the British National Formulary (note that some OTC products' dosing schedules are different than these):

- Ages 3 to 5 months: 50 mg three times a day
- Ages 6 to 11 months: 50 mg three or four times a day
- Ages 1 to 3 years: 100 mg three times a day
- Ages 4 to 6 years: 150 mg three times a day
- Ages 7 to 9 years: 200 mg three times a day
- Ages 10 to 11 years: 300 mg three times a day

References

Meremikwu, M. M., & Oyo-Ita, A. (2002). Paracetamol versus placebo or physical methods for treating fever in children. *Cochrane Database System Review, 2*, CD003676.

Meremikwu, M. M., & Oyo-Ita, A. (2003). Physical methods versus drug placebo or no treatment for managing fever in children. *Cochrane Database System Review, 2*, CD004264.

Wong, T., Stang, A. S., Ganshorn, H., et al. (2013). Combined and alternating paracetamol and ibuprofen therapy for febrile children. *Cochrane Database System Review, 2*, CD009572.

Further reading

Dodd, S. R., Lancaster, G. A., Craig, J. V, et al. (2006). Sensitivity and specificity of aural compared with rectal thermometers: A meta-analysis. *Journal of Clinical Epidemiology, 59*, 354–357.

National Institute for Health and Care Excellence (NICE). (2019). Fever in under 5's: Assessment and initial management. https://www.nice.org.uk/guidance/ng143

Infectious childhood skin conditions

Background

A number of infectious diseases are more prevalent in children than the rest of the population. Many of these diseases are now vaccine preventable, and the provision of immunization programmes has almost eradicated them from developed countries. However, some conditions have no vaccine, or incomplete vaccine cover is provided, which means it is still possible to see patients with these problems.

Arriving at a differential diagnosis

Most conditions are self-limiting viral infections associated with no clinical complications. However, measles and meningitis pose serious health concerns to the patient but are now rarely seen (Table 11.12).

Most likely causes

Chickenpox

Chickenpox is very common and is probably the most likely infectious childhood rash seen in community pharmacy (in the United Kingdom, >80% of people have been infected by the age of 10 years). It is the primary infection observed when the patient contracts the varicella zoster virus, which is transmitted by droplet infection or with contact with vesicular exudates. The incubation period ranges from 10 to 20 days, and before the rash develops, the patient might experience up to 3 days of prodromal symptoms that could include fever, headache and sore throat. The rash typically begins on the face, stomach and back before spreading to other parts of the body. Initially, lesions appear as small red lumps that rapidly develop into vesicles, which crust over after 3 to 5 days. New lesions tend to occur in crops of three to five for the first 4 days; at the height of infectivity, lesions appear in all stages of development (Fig. 11.6). The vesicles are often extremely itchy, and secondary bacterial infection caused by scratching the vesicles is not unusual. Chickenpox is highly contagious, from a few days before the onset of rash until all lesions have crusted over. Reinfection results in people developing shingles (see Fig. 9.46).

Table 11.12
Causes of infectious disease and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	- Chickenpox - Impetigo - Molluscum contagiosum
Likely	- Erythema infectiosum (fifth disease) - Roseola infantum (sixth disease)
Unlikely	- Hand, foo, and mouth disease
Very unlikely	- German measles (rubella) - Measles - Meningitis - Mumps - Scarlet fever

Impetigo

Impetigo is caused by a bacterial infection, most notably *Staphylococcus aureus* or *Streptococcus pyogenes.* It presents mainly on the face and around the nose and mouth but can also affect the limbs. Most cases are a ‘nonbullous’ form that starts as a small, red, itchy patch of inflamed skin that quickly develops into vesicles that rupture and weep. The exudate dries to a brown-yellow sticky crust (Fig. 11.7). The bullous form presents with fluid-filled vesicles of varying size that rupture after 2 to 3 days, leaving a yellow-brown crust. For differentiation of impetigo from other skin conditions that primarily affect the face, refer to Chapter 9.

Impetigo is contagious, and children should be kept off school until the lesions have healed, dried and crusted over. General hygiene measures should include not sharing towels, which helps to prevent household contacts from contracting the infection. Treatment involves topical or systemic antibiotics (e.g., fusidic acid twice daily or flucloxacillin four times a day) or hydrogen peroxide cream.

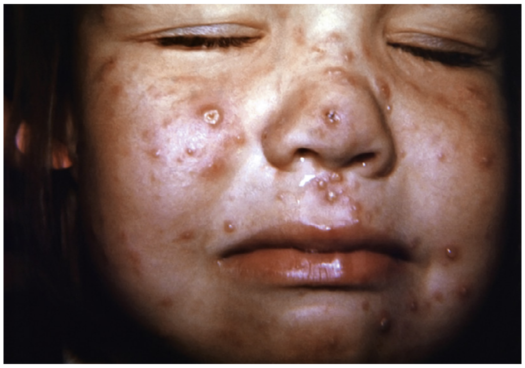

Fig. 11.6 Chickenpox. (From Kliegman, R. M., Stanton, B. M. D., Geme, J., St., & Schor, N. F. [2016]. *Nelson textbook of pediatrics* [20th ed.]. Saunders.)

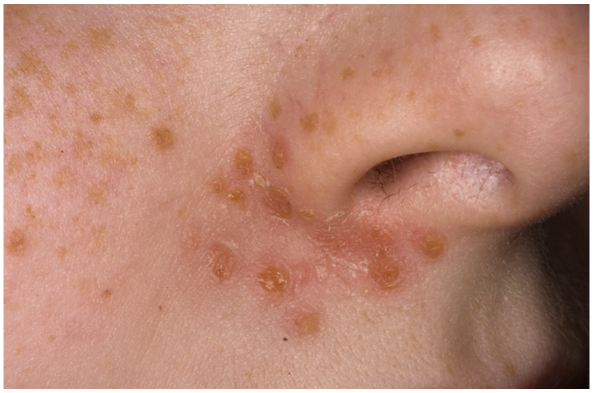

Fig. 11.7 Impetigo. (From Habif, T. B. [2010]. *Clinical dermatology: A color guide to diagnosis and therapy.* Mosby, Elsevier.)

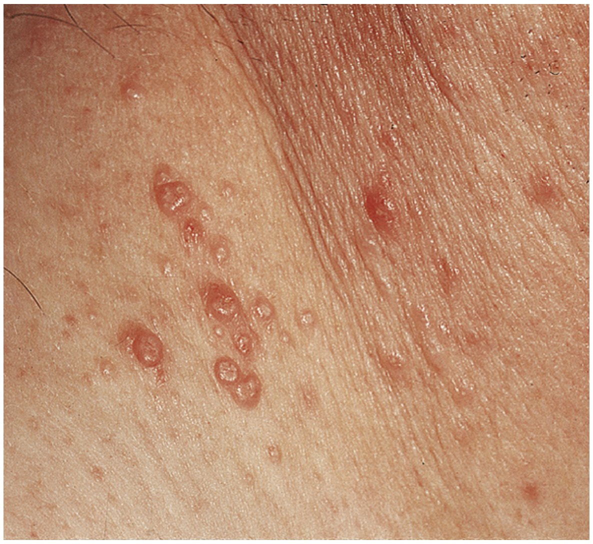

Fig. 11.8 Molluscum contagiosum. (From Gawkrodger, D. J. [2007]. *Dermatology: An illustrated colour text* [4th ed.]. Churchill Livingstone, Elsevier.)

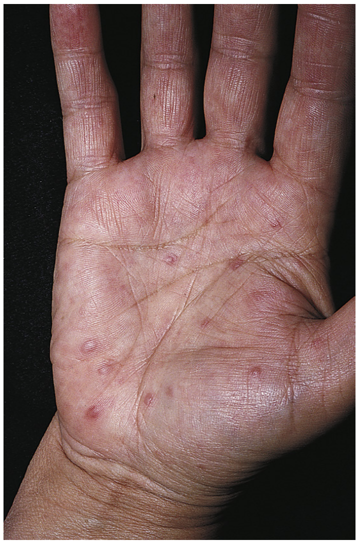

Fig. 11.9 Hand, foot and mouth disease. (From Callen, J. P., Greer, K. E., Paller, A. S., & Swinyer, L. J. [2000]. *Color atlas of dermatology* [2nd ed.]. WB Saunders.)

Molluscum contagiosum

Caused by a pox virus, molluscum contagiosum is usually transmitted by indirect contact (e.g., sharing towels), although it is not very contagious. The face and axillae are common sites of infection. They generally appear in crops and appear as pink, pearl-like spots usually less than 0.5 cm in diameter. All lesions have a central punctum that is a diagnostic feature (Fig. 11.8). The condition spontaneously resolves (usually within 12 months), but if the parent or child is anxious, referral to a GP should be made because liquid nitrogen can be used to remove the lesions.

Conditions to eliminate

Likely causes

Erythema infectiosum (Fifth disease)

Erythema infectiosum is caused by parvovirus B19 and predominantly affects children between the ages of 3 and 15 years. Coldlike symptoms appear a couple of days before the rash appears. Typically, the rash appears on the cheeks and presents as red, inflamed marks (like the person has been slapped). Itch is often present, and the rash can spread to the arms and legs. Low-grade fever may also occasionally be present.

Roseola infantum (sixth disease)

Roseola infantum is probably caused by a neurodermotropic virus and is most prevalent in infants. The onset is with a sudden high-grade fever (40°C) that lasts 3 to 5 days before a macular rash develops on the trunk, which can spread to proximal extremities (see Fig. 11.4). The rash blanches when pressed.

Unlikely cause

Hand, foot and mouth disease

Prodromal symptoms of fever, malaise, loss of appetite, and possibly sore throat or mouth and cough can be seen 1 or 2 days before lesions appear. Greyish papules appear before blistering on the sides of the fingers, hands and feet. Small blisters can develop in and around the lips and mouth (Figs. 8.5 and 11.9). These can be painful.

Very unlikely causes

German measles (rubella)

Rubella is caused by an RNA virus and spread by close personal contact or airborne droplets. It is less contagious than measles; if contracted, many people have mild symptoms, and the infection can pass undiagnosed. After the incubation period of 14 to 21 days, the child experiences up to 5 days of prodromal symptoms, which include coldlike symptoms and swollen glands in the neck before a rash appears on the face, which quickly moves to the trunk and extremities. The rash tends to be pinpoint and macular. The biggest threat posed by rubella is to females in early pregnancy because foetal damage is possible.

Measles

Measles is caused by an RNA virus and spread by droplet inhalation. Measles has an incubation period of between 7 to 14 days, which is then followed by 3 or 4 days of prodromal symptoms, when the child will have a fever, head cold, cough and conjunctivitis. A blotchy maculopapular rash appears around the ears before moving to the trunk and limbs. Immediate referral to a GP is needed. Small white spots are visible on the inner cheek and gums, like grains of salt, and are known as Koplik spots; these are diagnostic for measles. Approximately 7% of patients develop respiratory complications such as otitis media and pneumonia, but encephalitis is seen in about 1 of every 600 to 1000 cases of measles.

Meningitis

The peak incidence of contracting meningitis is between 6 and 12 months old. It is commonly associated with a petechial or purpuric nonblanching rash, but this develops in the latter stages of the disease. In the initial stages of the disease, signs and symptoms are nonspecific and are similar to those of flu. Symptoms include fever, nausea,

Table 11.13

Summary of the presenting features of infectious childhood skin conditions

Sign or symptom	Measles	German measles	Meningitis	Glandular fever[a]	Chickenpox	Molluscum contagiosum	Mumps	Impetigo	Erythema infectiosum	Scarlet fever	Roseola	Hand, foot and mouth
Prodromal stage												
Fever	Yes	No	Yes	Yes	Yes, in older individuals	No	Yes	No	No	Yes	Yes	Yes
Swollen glands	No	Yes	No	Yes	No	No	Yes	No	No	No	No	No
Coldlike symptoms	Yes	Yes	No	No	No	No	No	No	Yes	Sore throat	No	Sore throat possible
Other signs	Koplik spots	Malaise	Lethargy, stiff neck, vomiting, photophobia	Malaise, headache	Malaise, headache	None	None	None	None	Headache	None	Malaise
Rash												
Location	Ears and face, progressing to the trunk and limbs	Face, moving quickly to the trunk	Trunk and limbs	Trunk	Trunk and face; rarely the extremities	Face and axillae	N/A	Facial area, especially around nose and mouth	Face before moving to the arms and legs	Abdomen before spreading to the neck, limbs and extremities	Trunk and limbs	Sides of fingers, feet and around lips
Character	Maculopapular	Macules, often pinpoint by day 2	Purplish blotches; do not blanch	Maculopapular in 10%	Discrete vesicles and appear in crops	Pink pearl-like spots with central punctum[a]	N/A	Vesicles that exude forming yellow crusts	‘Slapped’ skin	Blanching	Blanching	Mixture of papules and vesicles
Itch	No	No	No	No	Yes - severe	No	N/A	Yes- mild	No	No	No	No
Epidemiology												
Age most affected	Children and adolescents	Younger than 12 years	Younger than 5 years	15–24 years	Younger than 10 years	Young children	Younger than 12 years	School-aged children	Children, adolescents	Younger than 8 years	Younger than 1 year	Younger than 4 years

[a] For completeness, glandular fever is included, although this is condition seen in adolescents and young adults rather than children.

N/A, Not applicable.

vomiting, headache and irritability. Symptoms can develop quickly, in a matter of hours, and can be unpredictable, especially in infants and young children. Symptoms of fever, lethargy, vomiting and irritability are common in children aged between 3 months and 2 years. In infants, floppiness and a dislike of being handled are also common features. Symptoms more common in older children include severe headache, stiff neck and photophobia. Any child who experiences neck pain when asked to place the chin on the chest must be immediately referred.

Since the introduction of the UK vaccine schedule, the numbers of confirmed meningitis cases have fallen to an all-time low.

Mumps

Mumps is caused by a paramyxovirus and is transmitted by airborne droplets from the nose and throat. There is an incubation period of 16 to 21 days, after which symptoms of fever and malaise typically occur 1 day or so before swelling of the parotid glands. The child experiences pain when the mouth is opened. Mumps is much more unpleasant if contracted as an adult, and in 20% to 30% of males, the disease affects the testicles, with a serious infection, possibly causing sterility. The most serious complication from mumps is meningitis (seen in ~10% of people).

Scarlet fever

Scarlet fever is a notifiable infectious disease caused by the bacteria *S. pyogenes*. Twelve to 48 hours before the rash develops, patients may present with sore throat, headache and low-grade fever. The rash, which is blanching, starts on the abdomen before spreading to the neck, limbs and extremities. The rash has a rough, sandpaper-like texture. Mouth inspection often reveals a 'strawberry tongue' (see Fig. 11.5).

To aid the differential diagnosis of childhood conditions, Table 11.13 summarizes their presentation.

Websites

Charities: https://www.meningitis.org and https://www.meningitisnow.org

Nappy (diaper) rash

Background

Nappy rash is a nonspecific term used to describe inflammatory eruptions in the nappy area.

Prevalence and epidemiology

The prevalence of nappy rash is difficult to determine because of variability among studies, but in one UK study, 25% of infants younger than 1 month had an episode of nappy rash, and most newborns exhibit some skin breakdown in the first few weeks.

Aetiology

Excessive friction and maceration of the skin lead to the skin barrier's being compromised. This is compounded by excessive heat and moisture and prolonged skin contact with faecal and urinary enzymes. Secondary infections may follow because of skin irritation and pH changes to the skin surface.

Arriving at a differential diagnosis

The diagnosis should be straightforward, although identifying the cause can be more difficult. There are four forms of nappy rash, with irritant nappy rash being the most common (Table 11.14).

Clinical features of irritant nappy rash

The rash affects primarily the buttocks and appears as well-defined areas of confluent erythema but can involve the lower abdomen and upper thighs. The flexures, which are protected from exposure, are usually spared. The rash may show superficial scaling. Occasionally, the rash may be caused by an allergic reaction when the skin is sensitized to a specific allergen that may include a constituent of the nappy itself or baby wipes used.

Conditions to eliminate

Psoriasiform nappy eruptions

Infants usually develop this form of nappy rash within the first 4 months of life. It presents as well-demarcated erythematous plaques affecting the inguinal folds and gluteal cleft. It can show scaling that resembles psoriasis, although this is uncommon. Involvement away from the nappy area is common and affects the limbs, face and scalp. There may be a positive family history of psoriasis.

Table 11.14
Symptom presentation for the four causes of nappy rash

Presentation	Irritant	Candidal	Seborrhoeic	Psoriasiform
Flexure involvement	No	Yes	Yes	Yes
Satellite lesions	No	Yes	No	No
Can other sites be involved	No	Possibly	Possibly	Possibly
Rash description	Red, raw	Bright red and well demarcated	Shiny/greasy	Atypical for psoriasis as usually no scaling is present

Seborrhoeic dermatitis

Rash of seborrhoeic dermatitis is bright red and confluent. The flexures are not spared, and the rash can take on a diffuse, red, shiny or greasy look. It is common for other sites to be involved, such as the scalp and face.

Secondary infection

An environment that is wet and warm creates an ideal breeding ground for opportunistic infections. Most commonly, secondary infections are caused by *Candida albicans* (but other pathogens such as *S. aureus* can be involved). Candidiasis is associated with satellite lesions (i.e., away from the main skin involvement). The lesions tend to be papular or pustular.

Red flags indicative of referral: Nappy rash

Reason for referral	Why referring	Timeframe for referral
• Involvement of rash away from the nappy area	• Suggests psoriasiform or seborrhoeic causes	• As soon as practicable
• OTC treatment failure • Severe rash	• Requires prescription-only treatments	

Evidence base for over-the-counter medication and practical prescribing and product selection

Management centres on maintaining skin integrity by applying a protective layer of barrier cream, reducing inflammation and eliminating infection. Barrier creams are designed to rehydrate and soothe the skin. A number of chemical constituents have been formulated into barrier creams and include silicone, antiseptics and protectorants. Secondary infection with *Candida* spp. can be treated with an antifungal.

Preventive measures include

- Make sure the nappy fits correctly.
- Leave the nappy off for as long as possible each day.
- Changes nappies every 2 to 3 hours or as soon as soiled to reduce skin contact with urine and faeces.
- Avoiding using soaps for cleaning.
- For reusable nappies, change nappies as soon as they have been soiled. Washed nappies should be thoroughly rinsed to ensure that they do not contain residues of soap and detergent.

Barrier creams and protectorants (e.g., Drapolene, Metanium, Sudocrem)

These should be thinly applied to all skin surfaces, including the skin folds, after each nappy change. They have no side effects, although some products do contain potential sensitizing agents; it is best to patch test an area of skin before application.

Antifungals

An imidazole twice a day is recommended. Parents should be told not to use a barrier cream until the infection has settled.

Further reading

Baer, E. L., Davies, M. W., & Easterbrook, K. (2006). Disposable nappies for preventing napkin dermatitis in infants. *Cochrane Database System Review, 3*, CD004262.

Croup

Background

Croup is a frequent cause of respiratory distress in young children and results from inflammation or swelling of the larynx, trachea and vocal cords.

Prevalence and epidemiology

It mainly affects children between 6 months and 3 years of age. The incidence is highest between 1 and 2 years of age and occurs slightly more in males than females; it is more common in autumn and winter months.

Aetiology

Symptoms are triggered by a recent infection with parainfluenza virus and account for 75% of cases, although other viral pathogens include rhinovirus and respiratory syncytial virus.

Arriving at a differential diagnosis

Croup is the commonest cause of inspiratory stridor and manifests itself with cough and difficult or noisy breathing and tends to be a frightening experience for parents and children. It is important to differentiate croup from other problems which cause upper airway obstruction because most are medical emergencies, although thankfully these are uncommon (Tables 11.15 and 11.16).

Table 11.15
Causes of croup-like symptoms and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Croup
Unlikely	• Anaphylaxis • Foreign body aspiration
Very unlikely	• Bacterial tracheitis • Epiglottitis • Peritonsillar and retropharyngeal abscess

Table 11.16
Condition summary of croup and those conditions that can present with croup-like symptoms

	Croup	Tracheitis	Epiglottitis	Foreign body aspiration	Anaphylaxis	Abscess
Age	6 months to 3 years	Any age	2–6 years	Younger than 4 years	Any	Any
Onset	Gradual	Gradual	Sudden	Sudden	Sudden	Gradual
Fever	Low-grade fever	High-grade fever	High-grade fever	None	No	Yes
Nature of cough	Barking	Barking	Muffled, guttural cough (if present)	Barking	N/A	N/A
Swallowing	Normal	Difficult	Very difficult	Variable; depends on site of impaction and degree of blockage	Variable; depends on severity	Variable; depends on severity
Preferred posture	Recumbent	Sitting	Sitting upright	N/A	N/A	N/A
Drooling	No	No	Yes	No	No	Yes

N/A, Not applicable.

Clinical features of croup

Before the cough, upper respiratory tract symptoms, including coryza and nasal congestion or discharge, may have been present for between 12 and 72 hours. Croup symptoms occur in the late evening and night and involve inspiratory stridor and cough which is described as having a barking (seal-like) quality. In between episodes of coughing, the child may be breathless and struggle to breathe properly. Typically, symptoms improve during the day and often recur the next night, with most children seeing symptoms resolve in 48 hours. For management purposes, it is classed as mild, moderate or severe:

- Mild croup: no stridor at rest, barking cough
- Moderate croup: moderate stridor at rest, barking cough, no or little agitation
- Severe croup: significant stridor at rest with severe respiratory distress including sternal recession. The child may appear anxious, pale and tired.

Conditions to eliminate

Unlikely causes

Anaphylaxis

Urticaria and angio-oedema are often the first signs of anaphylaxis. The person will look and feel unwell. Airway swelling, breathlessness, wheeze and stridor will be present. Signs of shock may be present, including increased pulse rate, dizziness and looking pale and clammy.

Foreign body aspiration

Usually there is a clear history of foreign body inhalation or ingestion. When the trachea is involved, patients present with sudden choking followed by protracted cough and respiratory distress and stridor. In oesophageal cases, symptoms tend to be milder with symptoms of difficulty in swallowing and epigastric discomfort.

Very unlikely causes

Bacterial tracheitis

The child usually appears very unwell with high fever, a sudden onset of stridor and respiratory distress. It usually follows a viral-like respiratory illness.

Epiglottitis

Onset is usually acute with a few hours of high fever, lethargy, inspiratory stridor and rapidly worsening respiratory distress. Cough is usually minimal or absent. The child will appear anxious, pale and 'toxic' and is often sitting immobile with the chin slightly lifted and mouth open, drooling saliva.

Peritonsillar and retropharyngeal abscess

Peritonsillar or retropharyngeal abscess can present with dysphagia, drooling, stridor, dyspnoea, rapid breathing, neck stiffness, fever and unilateral cervical adenopathy. The onset is typically more gradual than with croup.

Red flags indicative of referral: Croup

Reason for referral	Why referring	Timeframe for referral
• Stridor	• Suggests moderate or severe croup, anaphylaxis, foreign body aspiration, tracheitis, epiglottitis or abscess	• Immediate to A&E
• Drooling	• Suggests epiglottitis or abscess	
• Choking	• Suggests foreign body aspiration	

Evidence base for over-the-counter medication and practical prescribing

Croup management is based on an assessment of severity. Parents should be advised that if the child's symptoms persist beyond 48 hours or they exhibit any symptoms of stridor or distress, medical intervention is required. Standard treatment for children with stridor would be oral or intramuscular dexamethasone or nebulized budesonide (Gates et al., 2018).

Reference

Gates, A., Gates, M., Vandermeer, B., et al. (2018). Glucocorticoids for croup in children. *Cochrane Database System Review, 8*, CD001955.

Self-assessment questions

The following questions are intended to supplement the text. Two levels of questions are provided, multiple-choice questions and case studies. The multiple-choice questions are designed to test knowledge and application of knowledge, and the case studies allow this knowledge to be put in context in patient scenarios.

Multiple-choice questions

11.1. A 12-week-old baby is brought to the pharmacy by his mother. He has a sore mouth. Which ONE of the following is the most likely diagnosis?

a. Teething
b. Mouth ulcer
c. Thrush
d. Leukoplakia
e. Herpes simplex

11.2. Which measurement of fever does NICE recommend for children younger than 5 years?

a. Underarm
b. Forehead
c. Oral
d. Anal
e. Either oral or under arm

11.3. A mother of a 3-year-old toddler asks for your advice. She says he has had a high temperature for the last 3 days, and she has noticed a rash on his upper trunk. She also says she has noticed numerous tiny little spots on the inside of the mouth and tongue. Which ONE of the following is the most likely cause of these symptoms?

a. Chicken pox
b. Measles
c. Mumps
d. Rubella
e. Scarlet fever

11.4. Which ONE of the following confirms the presence of a head louse infection?

a. Presence of egg cases (nits) in the hair
b. An itchy scalp
c. A live louse
d. Louse faeces on the pillow
e. Dead lice on a pillow

11.5. Which ONE of the following statements concerning threadworm management is incorrect?

a. All family members should be treated.
b. Mebendazole can be sold for those 6 months and over.
c. A repeated dose after 14 days is recommended.
d. Mebendazole can cause GI upset.
e. Bed linens should be washed at start of treatment.

11.6. Nappy rash that becomes secondarily infected with *Candida* spp. is most associated with which ONE of the following?

a. Itch and pain
b. Shiny, bright red lesions
c. Satellite lesions
d. Flexure involvement
e. Scaling lesions

11.7. Which ONE of the signs or symptoms represents a high risk in children younger than 5 years with fever?

a. Decreased activity
b. Respiration rate of less than 50 breaths/min
c. Reduced urine output
d. Pallor
e. Reduced skin turgor

11.8. At what age does colic usually resolve?

a. Within the first few weeks of birth
b. Before 6 months old
c. Between 6 and 12 months
d. Between 12 and 18 months
e. Before the age of 2 years old

11.9. Mrs Brown requests treatment for her 7-year-old son James. He has confirmed an active head lice infection. James has not had a previous infection. He has asthma and uses a salbutamol inhaler when required and beclomethasone 100-μg inhaler, two puffs twice daily. Which ONE of the following is the most appropriate treatment?

a. Bug buster kit
b. Dimeticone 4% lotion
c. Malathion 1% liquid
d. Permethrin 1% creme rinse
e. None of the above

11.10. A 7-year-old male accompanied by his mother presents to the pharmacy complaining of a restless night's sleep, and his mum says he has been itching his bottom. Which ONE of the following conditions is the most likely diagnosis?

a. Atopic dermatitis
b. Bacterial gastroenteritis
c. Contact dermatitis
d. Roundworm
e. Threadworm

11.11. A mother of a 5-year-old daughter wants some advice. Her daughter has developed a rash on her face. Based solely on this information, which ONE of the conditions is the most likely cause?

- **a.** Pertussis
- **b.** Psoriasis
- **c.** Atopic dermatitis
- **d.** Erythema infectiosum
- **e.** Pityriasis rosea

11.12. The mother of a 6-year-old child tells you her son has a rash on his upper trunk that appeared about 5 days ago, which has now spread to his face and limbs. His mother further explains he is scratching the rash a lot, especially at night. You find out he experienced general coldlike symptoms before the rash appeared. Which ONE of the following is the most likely cause of these symptoms?

- **a.** Chickenpox
- **b.** Impetigo
- **c.** Measles
- **d.** Rubella
- **e.** Urticaria

11.13. Itchy rash with which ONE of the following symptoms(s) or history is most indicative of atopic dermatitis?

- **a.** Family history of asthma
- **b.** Onset after 2 years of age
- **c.** Visible eczema
- **d.** Recent (6 months) history of dry skin
- **e.** Family history of eczema

11.14. Which ONE of the infections is most likely to present with fever as a major symptom in children?

- **a.** Upper respiratory tract infection
- **b.** Lower respiratory tract infection
- **c.** Urinary tract infection
- **d.** Impetigo
- **e.** Atopic dermatitis

11.15. Which ONE of the statements best describes the rash of measles?

- **a.** Rash appears around the ears before moving to the trunk and limbs.
- **b.** Rash appears on the face and quickly moves to the trunk and extremities.
- **c.** Rash starting on the abdomen before spreading to the limbs and extremities.
- **d.** Rash appears on the trunk and limbs.
- **e.** Rash typically begins on the face, stomach and back.

Questions 11.16 to 11.21 concern the following:

- **A.** Chickenpox
- **B.** Molluscum contagiosum
- **C.** Fifth disease (erythema infectiosum)
- **D.** Impetigo
- **E.** Psoriasis
- **F.** Atopic dermatitis
- **G.** Roseola infantum

Select, from A to G, which of the conditions:

11.16. Is associated with a facial rash, often resembling a ‘slapped cheek’

11.17. Can be mistaken for warts

11.18. Can lead to shingles in later life

11.19. Commonly affects cheeks and behind the knee

11.20. Is associated with high-grade fever

11.21. Is caused by bacterial infection

For questions 11.22 to 11.25, select the most likely diagnosis in each of the following scenarios:

- **A.** Chickenpox
- **B.** Measles
- **C.** Fifth disease (erythema infectiosum)
- **D.** Impetigo
- **E.** Rubella
- **F.** Scarlet fever
- **G.** Pertussis

11.22. A 7-year-old female who is sent home from school because she developed multiple vesicles on her face and arms.

11.23. An 18-month-old male appears irritable and unwell with a fever that lasts 2 days but then subsides, only to develop a maculopapular rash on his body.

11.24. A 5-year-old female is sent home from school because she feels poorly. She has been having coldlike symptoms the previous couple of days. Later that night, her mum notices a widespread pinpoint rash on her face and body.

11.25. A 9-year-old female has a sore throat, and examination reveals red spots on her palate. On day later, her father notices a fine red rash over her whole body.

Answers

11.1. Answer: c

Rationale: Based on age, leukoplakia (d) is associated with old age. Mouth ulcer (b) and herpes simplex (e) are more likely with older children. Teething (a) normally starts at around 6 months.

11.2. Answer: a

Rationale: NICE guidance states avoidance of oral and rectal routes (c, d or e) because of unacceptability in clinical practice, and forehead thermometers (b) are unreliable. Infrared tympanic thermometers could be used as an alternative.

11.3. Answer: b

Rationale: Rubella (d) is the only condition not associated with prodromal fever and can be discounted. Mumps (c) are not associated with rash. This leaves chicken pox (a), measles (b) and scarlet fever (e) as options. However, 'spots' on the oral mucous membrane is associated with measles.

11.4. Answer: c

Rationale: Faecal matter (d), dead lice (e) and egg cases (a) could suggest recent or current infection but are not diagnostic. Other causes of itchy scalp (b) are possible other than lice. Only confirmation of live lice (c) is truly diagnostic.

11.5. Answer: b

Rationale: The OTC license is from 2 years upwards. It can be given from 6 months of age as a prescription-only medication.

11.6. Answer: c

Rationale: Itch and pain (a) are not associated with nappy rash. Shiny lesions (b) and flexure involvement (d) are noted with seborrhoeic dermatitis. Scaling lesions can be seen with psoriasis (e). Fungal infections tend to show involvement away from the presenting lesions (c).

11.7. Answer: e

Rationale: Options a, c and d are all amber risk, and b is green. Option e is classified as red–high risk.

11.8. Answer: b

Rationale: Colic is associated with infants, so options c to e can be ruled out. Option a is when colic starts rather than stops.

11.9. Answer: a

Rationale: Chemical insecticides are no longer recommended because of resistance (c) and (d). Bug-busting kits (a) can work, but poor adherence can lead to low cure rates. Dimeticone (b) is currently recommended because cure rates are relatively high.

11.10. Answer: e

Rationale: Perianal itching in children is very strongly associated with threadworm, especially if symptoms are worse at night.

11.11. Answer: d

Rationale: Pertussis (a) does not have facial rash. Psoriasis (b) can have scalp involvement but lesions away from the hairline are rare. Pityriasis rosea (e) is associated with a rash on the body. This leaves atopic dermatitis (c) and erythema infectiosum (d); both could show facial lesions. Based on probabilities, erythema infectiosum (d) is more likely. Indeed, its alternative name is slapped cheek disease.

11.12. Answer: a

Impetigo (b) and urticaria (e) do not have prodromal symptoms, leaving chicken pox (a), measles (c) and rubella (d) as options. Generalized itchy rash best fits with a description of chicken pox (a).

11.13. Answer: d

Rationale: Although a family history of atopy (a and e) is associated with atopic dermatitis, in this case, it is not most indicative. Visible flexural eczema is a symptom, but c only states visible eczema. Onset is before 2 years of age rather than after 2 years of age (b). A history of dry skin is a marker for atopic dermatitis hence, option d is the correct answer.

11.14. Answer: c

Rationale: Atopic dermatitis (e) is not an infection, so it can be ruled out straight away. Impetigo (d) is not associated with fever. Options a to c can have fever as a symptom; however, from these options, urinary tract infection (c) has fever as a prominent feature.

11.15. Answer: a

Rationale: Option b describes German measles, c is scarlet fever, d describes sixth disease and e is chickenpox.

11.16. Answer: c

Rationale: Facial lesions can occur with chickenpox (a), molluscum contagiosum (b), fifth disease (c), impetigo (d) and atopic dermatitis (f). Chickenpox, molluscum contagiosum, impetigo and psoriasis have raised lesions. This leaves c as the correct answer.

11.17. Answer: b

Rationale: Fifth disease (c), psoriasis (e), atopic dermatitis (f) and roseola (g) are flat or slightly raised lesions and can be discounted; Chicken pox (a) is vesicular, and impetigo (d) is crusting and so can be eliminated. This only leaves molluscum contagiosum (b), which presents with raised lesions superficially similar to warts.

11.18. Answer: a

Rationale: Shingles is caused by the herpes zoster virus, and so, too, is chickenpox. Hence, option a is the correct answer.

11.19. Answer: f

Rationale: Chickenpox (a) and molluscum contagiosum (b) are seen on the face and trunk. Fifth disease (c) and impetigo (d) are usually on the cheeks but not the knees. Psoriasis (e) can be knees (but on the front, not back) and not the face. Roseola infantum (g) is seen on the trunk and arms.

11.20. Answer: g

Rationale: Molluscum contagiosum (b), fifth disease (c), psoriasis (e) and atopic dermatitis (f) are not associated with fever. Impetigo (d) can produce fever but is uncommon and low grade. Fever in chickenpox (a) is also low grade.

11.21. Answer: d

Rationale: Chickenpox (a), molluscum contagiosum (b), fifth disease (c) and roseola infantum (g) are viral. Psoriasis and atopic dermatitis (f) have mixed causes, but viral causes are not implicated.

11.22. Answer: a

Rationale: Facial rash is seen in chickenpox (a), measles (b), fifth disease (c), impetigo (d) and rubella (e). However, the only condition that is vesicular is chickenpox.

11.23. Answer: b

Rationale: Impetigo (d) does not have prodromal symptoms and can be eliminated. Chickenpox (a) has a vesicular rash, and mumps (g) does not exhibit a rash. This leaves measles (b), fifth disease (c) rubella (e), or scarlet fever (f) as plausible options, but measles rash tends to be maculopapular.

11.24. Answer: e

Rationale: Widespread pinpoint rash following coldlike prodromal symptoms best fits the description of rubella.

11.25. Answer: f

Rationale: Prodromal symptoms of sore throat from the conditions listed would be only really seen in scarlet fever.

Case studies

CASE STUDY 11.1

Ms JP, a young mother of two children, comes into the pharmacy one afternoon, clutching a letter from the children's primary school. The letter says that there is a head lice outbreak and instructs parents to treat their children for head lice.

a. How do you respond?

You need to find out if her children have head lice or if she is trying to buy a product to stop them from getting head lice. She should be told that products cannot be bought to prevent her children contracting head lice, and she should inspect their heads regularly. Only when live lice are found should a product be bought. Ms JP should be told how to inspect her children's hair for signs of head lice.

Ms JP returns to the pharmacy 4 days later and says her youngest daughter now has head lice. She is 5 years old and has no medical problems.

b. What product are you going to recommend?

Insecticides or a physical agent are possible treatment options. Because of insecticidal resistance and high cure rates seen with dimeticone, it would seem reasonable to use this as treatment of choice.

Ms JP says she has heard that you can use conditioner and that will get rid of the problem.

c. How do you respond?

Ms JP is probably referring to the 'bug-busting' technique. She should be told that the effectiveness of bug busting depends on how well people adhere to the regimen because poor compliance with the bug-busting method is probably why its effectiveness has been questioned.

Ms JP then asks you whether her older daughter, Samantha, should also be treated even though she does not have head lice.

d. What do you say?

No. Only those with live lice infestations should be treated. Ms JP should be asked to keep checking Samantha's hair on a regular basis.

CASE STUDY 11.2

Mr PB is looking after his 4-year-old grandson for the weekend. He asks for some advice because he has noticed a rash on his grandson's body and wants something to help get rid of it.

a. What do you need to know?

- *The location of rash: Is it symmetrical/asymmetrical? Has it spread?*
- *What the rash looks like: macules, papules, vesicles; raised or scaling*
- *Onset*
- *Associated symptoms such as itch*
- *General health of the child*
- *What symptoms, if any, the child had before the rash appeared*

All Mr PB is able to tell you is that his grandson has been with him for the past 2 days and only noticed the rash this morning when he was dressing him. The rash is on his chest and back; Mr PB describes them as spots. He thinks it is probably itchy because he saw his grandson scratching it this morning.

b. What do you think could be the problem?

Without seeing the child and the rash, it is always difficult to make a differential diagnosis from information from a third party, but given his age, acute onset and location of rash, which itches, chicken pox seems likely.

c. Are there any further questions you could ask the male to confirm your diagnosis?

- *Are the spots coming out in groups?*
- *Has he been exposed to other children with chickenpox?*
- *How was he in himself before he noticed the rash?*

Mr PB is unsure about the spots or exposure. He says his grandson seems fine, and he has not noticed anything else wrong with him.

d. What could you currently recommend?

It appears that his grandson is not systemically unwell from his grandfather's description, and you could manage his symptoms. You say it sounds like chicken pox, but without seeing the rash, you cannot be sure. Itching could be helped with an antihistamine. You also tell the grandfather that if it is chicken pox, then he is infectious until the last spots crust over. It would be advisable to keep him away from his friends. It would be useful if you could see the child over the next couple of days to confirm your suspicions.

CASE STUDY 11.3

A mother of a 3-month-old female asks for help with her baby; she seems to be crying all the time.

a. What initial further information would you need?

When did the crying start?
How often does the baby cry?
Nature of the crying

Mum tells you the baby has been crying for the past 2 or 3 weeks like this and she is now at a loss. The baby seems to be crying all the time and goes on for ages and seems distressed. The baby cries even after feeding, burping and nappy changes.

b. What do you think the problem is?

Colic seems the most obvious cause of the baby's symptoms.

c. What other questions could be asked to help with your differential diagnosis?

Presence of systemic symptoms: absent in colic but present with injection

Weight gain: should be normal with colic and abnormal in malabsorption conditions

She tells you that the baby is otherwise healthy. This seems to support a diagnosis of colic.

d. What advice could you offer in this situation?

- *You could sign post her to self-help groups and NHS sites for further support.*
- *Tell her the medicines such as gripe mixtures are not helpful.*
- *Stress to her that babies grow out of colic, and it is unusual for symptoms to be seen after 4 to 6 months.*
- *Make sure she is looking after her own well-being (she says she is 'at a loss').*
- *If she is still finding it difficult to cope, then she should see the GP because it may be possible that they can arrange further help and support.*

Chapter 12

General Health

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Nosebleeds

Background

Epistaxis, or nosebleed, is a common complaint which is usually benign, self-limiting and spontaneous.

Prevalence and epidemiology

Epistaxis usually occurs in children aged 2 to 10 years, with a peak frequency between 3 and 8 years of age. It is the most common otolaryngologic emergency, affecting up to 60% of the population in their lifetimes. There is an increased incidence of epistaxis observed during winter months.

Aetiology

The primary cause of epistaxis is minor trauma. Other less common causes include liver disease, which can lead to clotting factor deficiencies (II, VII, IX, X), anatomic deformity or pathological changes causing growth of benign or malignant tumour.

Arriving at a differential diagnosis

The most likely causes of nosebleeds tend to be through local trauma through nose picking in children or external nasal trauma resulting from a force to the nose (Table 12.1). Typically, this may be from a fall, sports injury or motor vehicle accident. Environmental factors involve temperature and humidity changes can result in mucosal drying and epithelial damage, making nosebleeds more likely. Other factors implicated include exposure to chemicals and cigarette smoke. Symptom-specific questions should be asked to help establish a differential diagnosis (Table 12.2).

Conditions to eliminate

Likely causes

Complication of local infections (e.g., common cold)

Symptoms of sore throat, nasal congestion or rhinorrhoea, general malaise, fever and cough are typical presenting symptoms.

Foreign body

Foreign bodies in the nose are associated with young children and produce unilateral mucopurulent foul-smelling nasal discharge,

Table 12.1
Causes of nosebleeds and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Environmental: temperature and humidity changes • Epistaxis digitorum (nose picking) • Trauma
Likely	• Complication of local infections • Foreign body • Polyp
Unlikely	• Deviated nasal septum • Medicines • Rhinitis
Very unlikely	• Alcoholism or liver disease • Granulomatosis with polyangiitis • Hypertension • Inherited bleeding disorders • Tumour

Table 12.2
Specific questions to ask the patient: Nosebleeds

Question	Relevance
Precipitating factors	• Check for environmental factors. • Check for history of excessive alcohol consumption. • Systemic medications such as anticoagulants and antiplatelets or local use of corticosteroids
Unilateral vs bilateral	• Unilateral: suggests foreign body, deviated nasal septum, tumour • Bilateral: bleeding disorders, alcohol or liver disease, medicines, granulomatosis with polyangiitis
Ease of bleeding or bruising	• A history of such problems may indicate a bleeding disorder.

although this discharge can become blood stained or lead to nosebleeds.

Polyps

Polyps effect 1% to 4% of the general population, with a peak incidence in individuals between the ages of 20 and 40 years. They are usually bilateral. When they are small, they can be asymptomatic, but as they grow, they cause blocked or runny nose, loss of smell, nosebleeds, postnasal drip and sinus pain.

Unlikely causes

Deviated nasal septum

When a deviated septum is severe, it can block one side of the nose and reduce airflow, causing difficulty breathing. The exposure of a deviated septum to the drying effect of airflow through the nose may sometimes contribute to crusting or bleeding. Patients might report noisy breathing during sleep.

Medicines

Corticosteroids, nonsteroidal antiinflammatory drugs (NSAIDs), anticoagulants and antiplatelet medications increase the risk of nosebleeds as well as illicit drug use (e.g., cocaine).

Rhinitis

Symptoms of nasal discharge, itching and sneezing predominate. Associated symptoms of conjunctivitis, cough and itching oral palate are also common.

Very unlikely causes

Alcoholism or liver disease

Regular alcohol consumption reduces platelet aggregation and prolongs the bleeding time; these effects, coupled with haemodynamic changes such as vasodilatation and changes in blood pressure, may be important in causing some cases of arterial nosebleeds in adults. Liver disease can lead to clotting factor deficiencies, leading to an increase likelihood of nosebleeds.

Granulomatosis with polyangiitis

Signs and symptoms of granulomatosis with polyangiitis are wide ranging, but the first warning signs usually involve the sinuses, throat or lungs. The condition often worsens rapidly, affecting blood vessels and the organs they supply, leading to symptoms such as such as sinus infections, nosebleeds, coughing, shortness of breath or wheezing, fever, fatigue and joint pain.

Hypertension

The association between hypertension and nosebleed is inconsistent in the medical literature, and there is a lack of evidence to establish a causal relationship.

Inherited bleeding disorders

For patients with known inherited bleeding disorders, such as von Willebrand disease or haemophilia, as well as for patients with abnormal nasal vasculature (e.g., hereditary haemorrhagic telangiectasia [HHT]), nosebleeds are a recognized problem. Such conditions are usually identified in children and adolescents. Patients bruise easily; show slow healing times for cuts; and in HHT, have lacy red vessels or tiny red spots, particularly on the lips, face, fingertips, tongue and inside surfaces of the mouth.

Tumour

Tumours, either benign (e.g., angiofibroma) or cancerous, cause nasal obstruction, rhinorrhoea, facial pain, hearing loss, persistent lymphadenopathy or evidence of cranial neuropathy (e.g., facial numbness or double vision). Most cancers are more common in people older than 50 years of age.

Red flags indicative of referral: Nosebleed

Reason for referral	Why referring	Timeframe for referral
Nasal obstruction Facial pain Hearing loss Persistent lymphadenopathy	Suggests tumour	Urgent general practitioner (GP) referral
Patients who easily bruise	Suggests a bleeding disorder	
Shortness of breath	Suggests granulomatosis with polyangiitis	
Heavy blood loss	Outside the scope of pharmacists	Refer to accident and emergency department

Evidence base for over-the-counter medication and practical prescribing and product selection

For active nosebleeds, the patient should sit with their upper body tilted forward and their mouth open to minimize swallowing blood. Nose pinching is likely to resolve bleeding. Sustained nasal compression to the lower third of the nose (direct pressure at the tip of the nose) for 5 minutes or longer should be performed. If this fails to resolve bleeding, then either nasal cautery or nasal packing could be considered.

In most cases, on examination, the source of bleeding is clearly visible, and the bleeding point is cauterized with a silver nitrate stick. If the bleeding point cannot be seen, then nasal packing is recommended. This should only be performed by those competent to do so.

Further reading

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Tired all the time

Background

Tiredness is experienced by almost everyone at some point. It is a very common primary care presentation. It can negatively impact on the person's ability to function normally, affecting personal and work life. For most people, episodes of tiredness spontaneously resolve, but for some, tiredness is a chronic problem.

Prevalence and epidemiology

The exact prevalence of fatigue is difficult to establish. Chronic fatigue can occur in all age groups and is higher in females, people with lower educational and occupational statuses and those who are physical inactive.

Aetiology

Lifestyle, physical illnesses and mental illnesses contribute to general tiredness or the development of chronic fatigue.

Arriving at a differential diagnosis

Tiredness is a normal part of life, but it is a vague and nonspecific symptom of many conditions, including serious illnesses (Table 12.3). It is also associated with being overweight and early pregnancy. Asking symptom-specific questions helps to establish a differential diagnosis, but a diagnosis is made in fewer than half of patients with fatigue (Table 12.4). A general physical examination should also be performed to check for signs such as ankle oedema (heart failure), tachycardia (anxiety, stress), bradycardia (hypothyroidism) and bounding pulse (hyperthyroidism, anaemia).

Clinical features

A typical presentation is a person who has been experiencing tiredness or fatigue for some time, who may have self-labelled the cause or wants a 'tonic' or 'pick-me-up' to help relieve the symptoms.

Most likely causes

Anxiety or stress

Anxiety and stress, besides manifesting with psychological symptoms such as irritability, difficulty concentrating and restlessness, can exhibit physical symptoms, including headaches, palpitations, shaking, shortness of breath, poor sleep and tiredness. Typically, there will be a trigger causing symptoms such as exams, bereavement or moving home.

Table 12.3
Causes of 'tired all the time' and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	Anxiety or stress Work–life balance
Likely	Anaemia Diabetes Depression Fibromyalgia Thyroid disease
Unlikely	Chronic fatigue syndrome Gastrointestinal conditions Infection Medicines Obstructive sleep apnoea
Very unlikely	Addison disease Cancer Chronic kidney disease Cushing disease Heart failure Neurologic conditions

Table 12.4
Specific questions to ask the patient: Tired all the time

Question	Relevance
Onset	• Sudden onset: infection, medicines often the cause • Gradual onset: more chronic problems such as systemic causes
Precipitating factors	• Infection • Personal or work issues: marital problems, bereavement, job loss
Associated symptoms	• Muscle weakness: neurologic disease may present as tiredness, but specific muscle groups are likely to be weak • Musculoskeletal pain: fibromyalgia • Weight changes: endocrine causes, depression, Addison disease, Cushing disease, cancer • Polyuria: diabetes, renal dysfunction, Addison disease • Ankle swelling: heart failure • Bowel changes: depression, fibromyalgia, hypothyroidism
Blood loss	• Menstruation: leading to anaemia
Alcohol	• Excessive or prolonged use: liver dysfunction
Sleep pattern	• Early morning wakening: depression, snoring: sleep apnoea
Work	• Long working hours, shift work

Work–life balance

Long working hours and shift or night work can affect the pattern of waking and sleeping, leading to fatigue and tiredness. Life events, such as caring responsibilities and parental duties to young children, can also contribute to general tiredness.

Conditions to eliminate

Likely causes

Anaemia

Anaemia is commonly caused through dietary restriction, medicines or blood loss (e.g., menstruation). Typically, fatigue is prominent along with headaches and dyspnoea. Physical examination may reveal pallor, dry skin and hair changes.

Diabetes (type 2)

Tiredness is a common symptom of diabetes. Other common symptoms include polydipsia, polyuria, blurred vision, unexplained weight loss and recurrent infections.

Depression

Besides psychological symptoms, commonly depression can manifest with physical symptoms of as poor sleep, changes in appetite, changes in bowel habit and fatigue.

Fibromyalgia

Fibromyalgia is a very common disorder, particularly in middle-aged females, characterized by diffuse chronic musculoskeletal pain, fatigue, low mood, nonrestorative sleep and normal blood results. The American College of Rheumatology has established diagnostic criteria for the disease, which include a history of widespread pain in association with 11 of 18 specific tender point sites (see website link for further details). Patients with fibromyalgia often report dropping things because of pain and weakness, and fibromyalgia been associated with irritable bladder, irritable bowel syndrome (IBS), headaches and temporomandibular joint pain.

Thyroid disease

Tiredness is associated with both hypo- and hyperthyroidism. In hyperthyroidism, symptoms such as breathlessness, dysphagia, nervousness and hyperactivity are often present; in hypothyroidism, cold intolerance; weight gain, constipation and dry skin are often present.

Unlikely causes

Chronic fatigue syndrome

Suspect if the person reports longstanding debilitating fatigue that is worsened by activity and is not significantly relieved by rest, have unrefreshing sleep or sleep disturbance (or both) and experience cognitive difficulties (sometimes described as ‘brain fog’), which includes problems such as difficulty in speaking or retrieving words and numbers.

Gastrointestinal conditions

Several gastrointestinal (GI) conditions can exhibit tiredness as a general symptom, for example, inflammatory bowel disease (IBD), IBS, coeliac disease and hepatitis. For IBD, bloody diarrhoea is prominent. Lower abdominal pain is prominent in IBS, diarrhoea is prominent in coeliac disease and fever and nausea are prominent in hepatitis.

Infection

Some infections, such as glandular fever, have tiredness as a prominent symptom. Other infections can also have tiredness as a symptom, including flu, COVID-19, pneumonia, tuberculosis and human immunodeficiency virus (HIV). However, more prominent symptoms associated with each infection will be present.

Medicines

Many medicines can cause weakness and fatigue, and include antidepressants, high blood pressure medicines (angiotensin-converting enzyme [ACE] inhibitors, beta-blockers, calcium channel blockers), statins and antianxiety medicines.

Obstructive sleep apnoea

This is more common in obese males of increasing age. It should be suspected in those who are fatigued, are excessively sleepy through the day and are known to snore when asleep. People often complain of unrefreshing sleep and difficulty in concentrating.

Very unlikely causes

Addison disease

A diagnosis can be difficult because of the nonspecific nature of a range of common symptoms experienced. Fatigue is a very early common symptom seen in most patients. Other early symptoms include low mood, muscle weakness, weight loss and loss of appetite, increased urination and increased thirst. Over time these symptoms worsen, and other symptoms such as diarrhoea, abdominal pain, nausea or vomiting, dizziness, cramps and darkening of the skin, can occur.

Cancer

Most forms of cancer exhibit general signs and symptoms, including fatigue, although fatigue is often seen in advanced disease rather than a presenting symptom. Cancer-related fatigue tends to be chronic and not relieved by rest or sleep.

Chronic kidney disease

Symptoms can include changes to urine output, itching skin, nausea, weight loss and feeling tired. As kidney disease advances, other symptoms such as aching muscles, cramps, shortness of breath, insomnia and trouble concentrating can be experienced.

Cushing disease

Tiredness can be experienced but is not a prominent symptom. The main signs and symptoms of Cushing disease are a round, red face; hump on the back of the neck; skin changes such as stretch marks or acne; and unusual rapid weight gain, especially around the belly.

Heart failure

Tiredness and lethargy are the most prevalent symptoms in patients with heart failure and are accompanied with breathlessness, leg swelling, loss of appetite, poor exercise tolerance and productive cough.

Neurologic

Fatigue is commonly reported in patients with many neurologic illnesses, including multiple sclerosis, Parkinson disease, myasthenia gravis and stroke. Fatigue contributes substantially to quality of life and disability in people with these illnesses.

Red flags indicative of referral: Tired all the time

Reason for referral	Why referring	Timeframe for referral
• Significant weight loss	• Need to rule out malignancy, Addison disease and endocrine disorder	• Urgent GP referral
• Focal neurologic deficits (e.g., sensory loss, loss of balance)	• Possibly suggests neurogenerative diseases or malignancy	
• Debilitating fatigue of long-standing (>6 weeks') duration	• Suggests chronic fatigue syndrome	• As soon as practicable
• Fever	• Suggests infection	
• Muscle or joint pain	• Suggests fibromyalgia	
• Polyuria	• Suggests diabetes or Addison disease	
• Breathlessness	• Suggests anaemia or heart failure	

Evidence base for over-the-counter medication and practical prescribing and product selection

Intervention depends on the cause of tiredness. Blood tests can be conducted to check for anaemia, thyroid dysfunction, diabetes and Cushing syndrome, and appropriate treatments can be instigated. If chronic fatigue is caused by conditions such as chronic fatigue syndrome or fibromyalgia, then pain management, cognitive-behavioural therapies, physiotherapy and exercise can be tried.

Further reading

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Leg swelling

Background

Lower limb oedema is a challenging diagnostic problem. It is defined as swelling caused by an increase in interstitial fluid that exceeds the capacity of physiologic lymphatic drainage. Symptoms can be debilitating and subsequently impact quality of life.

Table 12.5
Causes of leg swelling and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Cellulitis
Likely	• Deep vein thrombosis • Medicines • Musculoskeletal injuries • Thrombophlebitis
Unlikely	• Heart failure
Very unlikely	• Compartment syndrome • Complex regional pain syndrome • Lipoedema • Lymphoedema: primary and secondary • Malignancy • Systemic disease ○ Hepatic (cirrhosis) ○ Hypothyroidism ○ Pulmonary ○ Renal (nephrotic syndrome) • Venous insufficiency

Prevalence and epidemiology

Because of the multiple aetiologies associated with leg swelling, it is frequently encountered. Of greatest concern in acute leg swelling is deep vein thrombosis (DVT) because it is common and can result in death because of pulmonary embolism.

Aetiology

Leg swelling can be caused by both local and systemic causes; in most cases, it occurs when fluid accumulates in subcutaneous tissues, leading to volume expansion.

Arriving at a differential diagnosis

Although there are many causes of leg swelling (Table 12.5), in a pharmacy setting, it is probably most likely that a patient will present with acute leg swelling caused by infection (cellulitis). Asking a number of symptom-specific questions helps to establish a differential diagnosis (Table 12.6).

Clinical features of cellulitis

Typically, a break in the skin allows *Streptococcus* or *Staphylococcus* bacteria to invade, causing acute onset swollen and tender skin that is red and painful to the touch. It is almost always unilateral, affecting the lower limb. Systemic symptoms can also be present, including fever and malaise. It can spread rapidly, and recurrence is common. Management involves systemic antibiotics, but before instigation, it is common practice to draw around the extent of the infection with a permanent marker pen to track the spread of the infection.

Table 12.6
Specific questions to ask the patient: Leg swelling

Question	Relevance
Acute vs chronic	• <72 hours: deep venous thrombosis (DVT), cellulitis, ruptured popliteal cyst, acute compartment syndrome, recent initiation of calcium channel blockers • >72 hours: systemic disease, venous insufficiency, lymphoedema, lipoedema, complex regional pain syndrome, malignancy
Skin temperature	• Acute DVT and cellulitis may produce increased warmth over the affected area.
Unilateral vs bilateral	• Unilateral: cellulitis, DVT, malignancy, complex regional pain syndrome, acute compartment syndrome • Bilateral: lipoedema, medication, systemic disease, venous insufficiency, (rarely DVT) • Uni or bilateral: lymphoedema
Area of oedema	• More local swelling of a calf may be a DVT, infection, secondary to injury. • Widespread limb involvement is more likely because of a systemic process.
Medication history	• Check for recent introduction of new medicines, especially calcium channel blockers.
Age	• The most likely singular cause of unilateral lower limb oedema in individuals older than 50 years old is venous disease.

Conditions to eliminate

Likely causes

Deep vein thrombosis

DVT results in obstruction to venous flow. Findings that suggest DVT include acute, unilateral pitting oedema, usually in the calf, associated with throbbing pain, redness, warmth and tenderness. Patients who develop DVT commonly have risk factors, such as increasing age, obesity, active cancer, recent surgery or trauma, hospitalization, immobilization, pregnancy, a preceding long flight or oral contraceptive use. Using Wells scoring helps to assess the probability of a DVT, but the diagnosis requires confirmation of a blood clot by venous ultrasound imaging.

Medicines

Medicine-induced leg swelling is relatively common. The presentation is usually acute and bilateral. Medicines implicated include hormone therapy, gabapentinoids and antihypertensives (especially calcium channel blockers) and anticancer drugs such as docetaxel.

Musculoskeletal injuries

Sprains, strains and fractures affecting the lower limb can cause localized swelling and pain. A recent history of trauma should be present. A ruptured Baker's cyst (rare) can present with similar symptoms of a DVT or acute thrombophlebitis. Symptoms of popliteal swelling with associated vague pain precede rupture symptoms.

Thrombophlebitis (superficial vein thrombosis)

This occurs in the lower legs and usually results from having varicose veins. Pain and swelling typically develop over hours to days and tend to resolve over days to weeks. The skin over the vein becomes red, and the area feels warm and tender. The vein feels like a hard cord under the skin, not soft like a varicose vein.

Unlikely cause

Heart failure

The onset of symptoms tends to be slow, insidious and nonspecific, making an early diagnosis challenging. Typically, shortness of breath, nighttime cough, fatigue, decreased exercise tolerance and painless bilateral ankle and lower limb swelling are seen. It is a condition of older adults with increasing prevalence with increasing age.

Very unlikely causes

Compartment syndrome

Compartment syndrome develops when swelling or bleeding occurs within a compartment, causing increased pressure on the capillaries, nerves and muscles. Acute presentations usually develop after a severe injury and cause intense pain with associated paraesthesia, constituting a medical emergency. Chronic presentations most often occur in the calf. The onset is gradual (months) and causes swelling, pain and sometimes paraesthesia. Tenderness and tightness of the muscle are common. It is often seen in runners because it is associated with strenuous activity. Rest alleviates symptoms.

Complex regional pain syndrome

This must be considered with a significantly painful, chronically swollen limb. The onset usually follows an injury to the leg. Pain can be intense even from slight contact and can persist for prolonged periods. Skin texture changes and discolouration are seen over time.

Lipoedema

Lipoedema is almost always bilateral nonpitting oedema of the legs with sparing of the feet. Swelling tends to worsen as the day progresses or in hot weather. The legs might take on a lumpy texture, and people may find walking difficult. Disproportionate pain, tenderness and an unusual tendency to bruise easily for no obvious cause are also experienced. It is more common in females and only very rarely affects males.

Lymphoedema: Primary and secondary

Lymphoedema is a chronic, progressive swelling of tissue that occurs because of excess accumulation of lymph caused by inadequate drainage. It is caused by a congenital abnormality or dysfunction in the lymphatic system (primary) or acquired (secondary), which includes trauma, infection and malignancy. Typically, it initially presents with painless unilateral or bilateral limb swelling including the foot, with pitting oedema present in early disease. The patient may also complain of a feeling of heaviness in the limb, especially at the end of the day and in hot weather. Over time the skin becomes thicker and rougher, and skin turgor is increased. In severe cases, the skin can break down.

Malignancy

Occult (site of primary tumour cannot be found) cancers may be present with apparently idiopathic DVT. A history of unexplained weight loss or adenopathy might suggest malignancy.

Systemic disease

Hepatic (cirrhosis)

Leg swelling is a recognized symptom of cirrhosis because of increased pressure in the portal vein. Accompanying symptoms include fatigue, loss of appetite, bruising easily, weight loss and itchy or yellow discolouration of the skin.

Hypothyroidism

One of the symptoms of hypothyroidism is swollen feet or lower limb. However, more obvious symptoms of tiredness, dry skin, hair loss, weight gain, constipation, cold intolerance and difficulty concentrating are seen.

Renal (nephrotic syndrome)

Nephrotic syndrome causes hypoalbuminaemia or hypoproteinaemia, which manifests with a wide range of signs and symptoms. Diffuse oedema is the predominant symptom, including lower leg oedema. Other symptoms include breathlessness, signs of infection, dizziness and fatigue. It is frequently accompanied by dyslipidaemia, abnormalities in coagulation, reduced renal function and immunologic disorders.

Venous insufficiency

Chronic venous insufficiency typically causes chronic leg or ankle oedema accompanied by discomfort or heaviness in the legs, aching, itching and skin discolouration or eczema or sometimes skin breakdown. People often have a history of hypertension, smoking, obesity, or inactivity or have a family history.

Red flags indicative of referral: Leg swelling

Reason for referral	Why referring	Timeframe for referral
● Acute onset unilateral calf swelling	● Possibility of a DVT	● Urgent GP referral
● Swelling after trauma	● Suggests musculoskeletal injury or compartment syndrome	
● Severe pain	● Suggests acute compartment syndrome, complex regional pain syndrome, lipoedema or ligament rupture	
● Skin rash with marked systemic upset	● Suggests cellulitis but needs prompt intervention	● Urgent GP referral because it may require hospitalization

HINTS AND TIPS BOX 12.1: LEG SWELLING

Treating or referring cellulitis in primary care. Only people with class I cellulitis can be managed in primary care with oral antibiotics.	The Eron classification of cellulitis is a useful guide for making management decisions: • Class I: There are no signs of systemic toxicity or uncontrolled comorbidities. • Class II: The person is either systemically unwell or systemically well but with a comorbidity (e.g., peripheral arterial disease, chronic venous insufficiency, morbid obesity) which may complicate or delay resolution of infection. • Class III: The person has significant systemic upset (e.g., acute confusion, tachycardia, hypotension), unstable comorbidities that may interfere with a response to treatment or a limb-threatening infection caused by vascular compromise. • Class IV: The person has sepsis or a severe life-threatening infection. Note: Data are taken from CKS clinical summaries.
DVT Wells scoring Each point scores 1 point. A score of ≥2 suggests that DVT is likely.	• Active cancer (treatment ongoing, within the last 6 months, or palliative) • Paralysis, paresis or recent plaster immobilization of the legs • Recently bedridden for ≥3 days or major surgery within the past 12 weeks • Localized tenderness along the distribution of the deep venous system (e.g., the back of the calf) • Entire leg is swollen • Calf swelling by >3 cm compared with the asymptomatic leg • Pitting oedema confined to the symptomatic leg • Collateral superficial veins (nonvaricose) • Previously documented DVT

Evidence base for over-the-counter medication and practical prescribing and product selection

Options to manage leg swelling in the pharmacy setting are very limited. The key roles for the pharmacist are to assess the swelling and make appropriate onward referrals unless the pharmacy operates Patient Group Directions for the supply of antibiotics for cellulitis. The 'Hints and tips' in Box 12.1 describe criteria to grade cellulitis and assess the likelihood of a DVT.

Further reading

Gasparis, A. P., Kim, P. S., Dean, S. M., Khilnani, N. M., & Labropoulos, N. (2020). Diagnostic approach to lower limb edema. *Phlebology, 35*, 650–655.

Websites

Lymphoedema Support Network. https://www.lymphoedema.org

Unintentional (unexplained) weight loss

Background

Weight loss is commonly seen in primary care and is an expected consequence of treatment or because of a known illness. However, progressive unintentional weight loss can indicate serious pathology. Medically, unintentional weight loss is generally defined as loss of more than 5% of usual body weight over 6 to 12 months.

Prevalence and epidemiology

Unintentional weight loss is common in older adults and occurs in 20% of the general older adult population. It is higher in high-risk populations, such as nursing home residents. There also exists an association exists between unintentional weight loss and death.

Aetiology

There is currently a poor understanding around the mechanisms involved with unintentional weight loss. Inflammatory cytokines such as tumour necrosis factor and gut hormones such as cholecystokinin have been implicated, but their roles are not fully understood.

Arriving at a differential diagnosis

Unintentional weight loss has a broad differential diagnosis, but common causes include psychiatric disorders and GI disease (Table 12.7). Malignancy is also a common cause, but as a presentation in community pharmacy, it is unusual. Asking symptom-specific questions helps to establish a differential diagnosis (Table 12.8).

Most likely causes

Anxiety

Anxiety may often present with only physical symptoms. These can be variable but include headache, insomnia, back pain and GI symptoms. Symptoms included in international diagnostic criteria (e.g., *Diagnostic and Statistical Manual of Mental Disorders*, fifth edition [DSM-5], or International Classification of Diseases, 11th revision) when establishing a diagnosis of generalized anxiety disorder are restlessness, poor concentration, irritability and sleep disturbance. Excessive anxiety and worry can lead to weight loss. It is worth noting that normal life events (e.g., marriage, divorce, bereavement) can precipitate anxiety symptoms and would not necessitate a formal diagnosis such as generalized anxiety disorder. It is most common in people aged 35-55 years of age, with women accounting for approximately two-thirds of cases.

Depression

Depressive episodes are associated with sleep issues, poor concentration, social withdrawal and lack of interest in usual activities.

Table 12.7
Causes of unintentional weight loss and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	• Anxiety • Depression
Likely	• Coeliac disease • COPD • Dementia • Diabetes • Hyperthyroidism • Inflammatory bowel disease • Peptic ulcer
Unlikely	• Alcohol use disorder • Eating disorders • Heart failure • Medicines • Parkinson disease
Very unlikely	• Addison disease • Endocarditis • Infection (serious) ○ HIV ○ TB • Malignancy

COPD, Chronic obstructive pulmonary disease; *HIV,* human immunodeficiency virus; *TB,* tuberculosis.

Like anxiety, depression can present with physical symptoms only including loss of weight (which is one of the DSM-5 symptoms).

Conditions to eliminate

Likely causes

Coeliac disease

Symptoms are often nonspecific, but adult patients have persistent GI symptoms that include steatorrhoea, bloating and abdominal pain accompanied by unintentional weight loss. Prolonged fatigue (often caused by anaemia) and persistent mouth ulcers can also be present. It can occur at any age put has two peaks of onset: shortly after weaning and people in their 20s and 30s.

Chronic obstructive pulmonary disease

Chronic obstructive pulmonary disease (COPD), beside chronic productive cough, is characterized by breathlessness that progressively worsens over time. Other symptoms include wheeze, reduced exercise tolerance and fatigue. People with COPD experience frequent respiratory tract infections. Patients often do not notice early symptoms, or they adjust their lifestyles to make breathing easier. Most people with COPD are current or former smokers, although a small proportion have had occupational exposure to chemicals and dust. Unintended weight loss is seen in severe cases and the later stages of the disease.

Dementia

Weight loss is often seen in the later stages of the disease. This may be because of a loss of appetite, pain or difficulties with swallowing and chewing.

Table 12.8
Specific questions to ask the patient: Unexplained weight loss

Question	Relevance
Social history	• Explore their current circumstances both at home and work.
Quantify weight loss	• Ideally, a baseline weight from which to compare the weight loss is needed. If this is not possible, then evidence of change in clothing size or confirmation of weight loss by a relative or friend should be sought. Ask questions such as: ○ *Have you noticed your clothes feeling looser than before?* ○ *Have you had to change your clothes because they are too big?* ○ *Have you noticed that you've gone down a few notches in your belt?*
Timeframe	• Establish over what period of time the weight loss has occurred. Ask questions such as: ○ *How long did it take for you to lose that much weight?* ○ *Do you know when you first started losing weight?*
Ask about appetite	• Assessing appetite determines if the weight loss is related to poor food intake. Ask questions such as: ○ *How has your appetite been lately?* ○ *Has your appetite changed at all?*
Establish calorie intake	• Ask about what they eat and how much they eat.
Diet and exercise	• Establish how much exercise and what kind of exercise they are doing and compare it with before they started to lose weight.

Diabetes

Clinical features of type 1 diabetes show ketosis and rapid weight loss in children and young adults. Sometimes people refer to type 1 diabetes symptoms as the 'four Ts': toilet (polyuria), thirsty, tired and thinner. For type 2 diabetes, polydipsia, polyuria, blurred vision, recurrent infection, tiredness and unexplained weight loss can be experienced.

Hyperthyroidism

Signs and symptoms of an overactive thyroid are numerous and can therefore be hard to diagnose. Symptoms include insomnia, fatigue, hyperactivity, mood swings, heat sensitivity, altered periods and weight loss despite having an increased appetite. Signs include shaking, palpitations, hair loss and goitre. In most cases, people aged between 20 to 40 years old are most affected.

Inflammatory bowel disease

Crohn's disease and ulcerative colitis are characterized by GI disturbance, either as persistent diarrhoea or bloody diarrhoea associated with urgency and tenesmus. Both exhibit lower abdominal pain. In Crohn's disease, the most common place for it to start is at the end of the small intestine (ileum), causing right lower quadrant pain. In ulcerative colitis, the pain is more common in the left lower quadrant. Over time weight loss can be observed.

Both also are associated with extraintestinal symptoms, affecting between 25% and 40% of patients, and include arthritis, mouth ulcers, red eye, and fatigue (caused by anaemia). Other nonspecific symptoms such as malaise and fever can be present. Young adults (20–40 years old) are most affected.

Peptic ulcer

Typically, the patient has well-localized, mid-epigastric pain described as 'constant', 'annoying', 'gnawing' or 'boring". In gastric ulcers, the pain is usually triggered by food (and not relieved by antacids) and experienced shortly after eating. In duodenal ulcers, the pain occurs 2 to 5 hours after meals, which is relieved by food and often awakens a person at night. Gastric ulcers are also more commonly associated with weight loss and GI bleeds than duodenal ulcers. The peak incidence of duodenal ulcers is between 45 and 64 years of age, whereas the incidence of gastric ulcers increases with age.

Unlikely causes

Alcohol use disorder

Weight loss can be seen in those who drink at unsafe levels. This tends to be part of a wider pattern of self-neglect, although alcohol's effect on organ function (e.g., the liver's inability to process fatty acids) leads to symptoms such as steatorrhoea that contributes to weight loss.

Eating disorders

These include anorexia, bulimia, binge-eating disorder and atypical eating disorder, the latter being the most common. It is seen almost exclusively in females (90%), especially those who are adolescents or young adults. In addition to weight loss (which can be rapid), other physical symptoms include GI problems and hormonal disturbances (e.g., amenorrhoea). Typically, mental health problems are observed such as depression, anxiety, stress and low self-esteem. Overconcern with body weight and shape is very common.

Heart failure

Often, the first symptoms patients experience is fatigue, breathlessness on exertion at rest or on lying flat. As the condition progresses from mild to moderate to severe heart failure, patients show ankle swelling and might complain of a productive, frothy cough, which may have pink-tinged sputum and maybe worst at night. Occasionally, people develop cardiac cachexia, leading to weight loss.

Medicines

A number of medicines are known to cause weight loss as an adverse drug reaction. These include metformin, acarbose, exenatide, zonisamide, topiramate, bupropion and fluoxetine. In addition, polypharmacy has been shown to interfere with taste and can cause anorexia.

Parkinson's disease

Weight loss can be a problem with those diagnosed with Parkinson's disease. This is probably multifactorial and includes difficulty in self-feeding, dysphagia and having a decreased appetite.

Very unlikely causes

Addison disease

This a rare condition affecting those aged 30 to 50 years old. Symptoms can be nonspecific and common to other conditions. Early symptoms include low mood, fatigue, muscle weakness, weight loss and loss of appetite, increased urination and increased thirst. Over time these symptoms worsen, and other symptoms such as diarrhoea, abdominal pain, nausea or vomiting, dizziness, cramps and darkening of the skin can occur.

Endocarditis (subacute)

This usually develops insidiously and progresses slowly. Early symptoms are vague and include fever, malaise, night sweats and weight loss.

Infection (serious)

Human immunodeficiency virus

After initial contraction of the HIV infection, most people experience flulike symptoms for a few weeks. Other non-flulike symptoms include rash, diarrhoea, cough and weight loss.

Tuberculosis

Symptoms of active tuberculosis (TB) usually begin gradually and worsen over a few weeks. Besides respiratory symptoms, the person may develop fever, chills, night sweats, tiredness and weight loss.

Malignancy (especially if advanced)

Unexplained weight loss is associated with many forms of cancer. The probability of malignancy is suggested by progressive onset of symptoms over weeks or months, which include change of bowel habit, rectal bleeding, neurologic deficit, haemoptysis, appetite loss and unintended weight loss.

Red flags indicative of referral: Unintentional weight loss

Reason for referral	Why referring	Timeframe for referral
• Melaena or change in bowel habit	• Possibility of GI cancer	• Urgent GP referral for potential referral on to a cancer referral pathway
• Dysphagia	• Possibility of oesophageal or oral cancer	
• Persistent cough for >3 weeks, with or without haemoptysis	• Possibility of lung cancer	
• Haematuria	• Possibility of urinary tract cancer	

Red flags indicative of referral: Unintentional weight loss—cont'd

Reason for referral	Why referring	Timeframe for referral
- Night sweats	- May suggest TB or endocarditis	- Urgent GP referral for further assessment
- Sleep disturbances	- Suggests psychological disorder or hyperthyroidism	
- Rapid weight loss in young adults	- Suggests diabetes	
- Breathlessness	- Suggests COPD or heart failure	
- Diarrhoea	- Suggests GI disorder, Addison disease or HIV	

Evidence base for over-the-counter medication and practical prescribing and product selection

All patients will need further evaluation, and instigation of any treatment is not recommended.

Further reading

Perera, L. A. M., Chopra, A., & Shaw, A. L. (2021). Approach to patients with unintentional weight loss. *The Medical Clinics of North America, 105*, 175–186.

Websites

Beat Eating Disorders. https://www.beateatingdisorders.org.uk

Lower urinary tract symptoms in males

Background

Various umbrella terms such as *overactive bladder syndrome* are used to categorize symptoms, but lower urinary tract symptoms (LUTSs) can be broadly grouped into problems of voiding or storage. Voiding symptoms include weak or intermittent urinary stream, hesitancy, dribbling and incomplete emptying. Storage symptoms include increased frequency, urgency, nocturia and incontinence and feeling the need to urinate again just after passing urine.

Prevalence and epidemiology

LUTSs are common problems in older males, with up to 40% of males older than 65 years of age reporting troublesome symptoms. Prevalence increases with increasing age.

Aetiology

Symptoms often arise when there is a blockage or obstruction at the exit of the bladder or from a weak detrusor muscle (smooth muscle of the bladder wall), leading to reduced bladder capacity. For example, benign prostatic hyperplasia (BPH) results from obstruction at the exit of the bladder. In addition, polyuria (secondary to diabetes) can exacerbate or mimic LUTSs. Lifestyle factors also can contribute to symptoms, including drinking fluids late at night, excess alcohol and caffeine.

Table 12.9
Causes of lower urinary tract symptoms and the likelihood of presentation in community pharmacy

Incidence	Cause
Most likely	- Benign prostatic hyperplasia
Likely	- Bladder stones - Infection - Medication
Unlikely	- Neurologic disease - Prostatitis - Urethral stricture
Very unlikely	- Bladder and prostate cancer

Arriving at a differential diagnosis

Although enlargement of the prostate gland is the most common reason males experience LUTSs, other conditions need to be considered (Table 12.9).

Clinical features of benign prostatic hyperplasia

BPH is a progressive enlargement of the prostate gland caused by long-term exposure of the prostate to testosterone. Enlargement puts pressure on the urethra, obstructing the flow of urine. Additionally, the bladder wall muscle may thicken, and a loss of elasticity may reduce the volume of urine it may hold. Symptoms tend to be both voiding and storage related. Storage symptoms include increased frequency, urgency, nocturia and incontinence, with patients describing frequent trips to the toilet, getting up in the night or anxiety that they might not reach the toilet in time. Voiding symptoms refer to decreased flow of urine, hesitancy, incomplete emptying, intermittency and dribbling. Patients may use terms such as 'stopping and starting' or 'dribbling'.

Conditions to eliminate

Likely causes

Bladder stones

Bladder stones can present with LUTSs, such as increased frequency associated with difficulty passing urine and nocturia. However, it presents with lower abdominal pain and cloudy or bloody urine.

Infection

Lower urinary tract infections present with typical LUTSs, including urgency, frequency and nocturia. There may also be dysuria, suprapubic pain and cloudy or bloody urine. In older males, confusion may also be present. Abnormal urine dipstick test findings can confirm the diagnosis.

Medication

Medicines are frequently implicated in causing symptoms. Those that contribute to voiding issues include ACE Inhibitors, antipsychotics, tricyclic antidepressants, sedative antihistamines, opioid analgesics, benzodiazepines and diuretics. Medicines causing storage problems include calcium channel blockers and selective serotonin reuptake inhibitors (SSRIs).

Unlikely causes

Neurologic disease

A number of neurologic conditions can show LUTSs, including multiple sclerosis, Parkinson's disease, dementia and diabetic neuropathy, but these are incidental symptoms compared with the major presenting symptoms of each condition.

Prostatitis

Acute prostatitis presents with a combination of UTI (dysuria, frequency, urgency) and LUTSs symptoms. Additionally, low back, rectal or penile pain can be experienced. Bacteraemia may be present with symptoms such as fever and tachycardia being present. A rectal examination will show a tender and swollen prostate. Prostatitis can become chronic (defined as symptoms for ≥3 months).

Urethral stricture

Narrowing of the urethra occurs generally because of formation of scar tissue caused by trauma (e.g., catheter use or medical procedures). Typical voiding LUTSs are experienced.

Very unlikely causes

Bladder cancer

Haematuria is the most common symptom. Dysuria and urinary frequency are also seen. If the cancer is locally advanced or metastasized, then unexplained weight loss, low back pain and fatigue may be present.

Prostate cancer

Symptoms closely mimic BPH but can also show haematuria, lethargy and weight loss. The risk of developing prostate cancer increases with age, a family history of the disease and being Black. An increased prostate-specific antigen (PSA) level, relative to age, helps to determine if cancer is a cause of symptoms.

Red flags indicative of referral:

Reason for referral	Why referring	Timeframe for referral
• Unexplained hematuria • Unintentional weight loss	• Suggests cancer	• Urgent GP referral to assess if need for suspected cancer pathway referral
• Fever • Loin pain • Confusion	• Suggests infection	• Same-day referral
• Low back or buttock pain	• Suggests prostatitis	

Evidence base for over-the-counter medication and practical prescribing and product selection

The use continence pads for occasional dribbling episodes should be encouraged. Fluid intake should be maintained, but caffeine intake should be reduced from drinks such as tea and coffee. PSA testing should be considered to gain a baseline International Prostate Symptom Score (0–35 in which <7 is mild, 8–19 is moderate and >20 is severe symptoms) as well as urodynamic testing. Depending on the results, it is likely the patient will be offered an alpha-blocker (e.g., alfuzosin or tamsulosin) or a 5-alpha reductase inhibitor (e.g., finasteride).

Self-assessment questions

The following questions are intended to supplement the text. Two levels of questions are provided, multiple-choice questions and case studies. The multiple-choice questions are designed to test knowledge and the application of knowledge, and the case studies allow this to be put in context in patient scenarios.

Multiple-choice questions

12.1. From the following, which ONE is the most effective medical treatment of nasal polyps?

a. NSAIDs
b. Systemic antihistamines
c. Topical antihistamines
d. Topical decongestants
e. Topical steroids

12.2. A 4-year-old child presents with bleeding from right side of his nose. He also gets purulent discharge from the same side. From the following, which ONE is the most likely diagnosis?

a. Foreign body
b. Local trauma
c. Polyps
d. Septal deviation
e. Tumour

12.3. From the following, which ONE is the most common cause of epistaxis?

a. Angiofibroma
b. Blood disorders
c. Blunt trauma
d. Hypertension
e. Idiopathic

12.4. Nasal obstruction can be unilateral or bilateral. Which ONE of the following is usually a bilateral presentation?

a. Adenocarcinoma
b. Angiofibroma
c. Deviated nasal septum
d. Foreign body
e. Polyp

12.5. From the following conditions, which ONE of the following is the most likely cause of nosebleed?

a. Angiofibroma
b. Dry nasal passages
c. Hypertension
d. NSAID use
e. Polyps

12.6. A 60-year-old female, who has recently been diagnosed with hypertension and takes atenolol, presents saying she is tired all the time, struggling to concentrate and feels nauseous, which has led to her not feeling like she wants to eat. You ask about if she has any aches and pains. She tells you she has been experiencing some knee joint pain but puts this down to age. She also says she been finding concentrating difficult. Which ONE of the following is the most likely diagnosis?

a. Chronic renal failure
b. Hepatitis
c. Hyperparathyroidism
d. Medication side effects
e. Osteoarthritis

12.7. A 52-year-old female presents with pain in multiple joints, especially her hands and back. She says her hands intermittently are swollen, and her grip is weak. She tells you she is always tired. However, on examination, there is no discernible swelling of the hands, although there appears to be widespread tenderness. Blood tests are performed, but all are normal. Which ONE of the following is the most likely diagnosis?

a. Fibromyalgia
b. Hypothyroidism
c. ME
d. Osteoarthritis
e. Rheumatoid arthritis

12.8. A 35-year-old female reports feeling ‘rubbish’. She says she is constantly tired, her face is a red mess and she’s put on weight. She takes the oral contraceptive pill. Which ONE of the following is the most likely diagnosis?

a. Alcohol use disorder
b. Coeliac disease
c. Cushing disease
d. Polycystic ovary syndrome
e. Stress

12.9. A 47-year-old female complains of a 6- to 12-month history of aching all over. She is sleeping poorly and is tired all the time. The pain is pretty much constant but flares up without any real reason. After tests, which rule out causes such as arthritis, a diagnosis of fibromyalgia is reached. Which ONE of the following therapeutic options would be most appropriate?

a. Aerobic exercise
b. Acupuncture
c. An NSAID
d. An SSRI
e. Methotrexate

12.10. Medicines can cause tiredness. Which ONE of the following is reported to cause tiredness most frequently?

a. Aspirin
b. Atenolol
c. Atorvastatin
d. Ramipril
e. Sertraline

12.11. A patient middle-aged male patient presents with acute pitting oedema and pain in his right lower extremity that started yesterday. Physical examination detects redness, warmth and tenderness in the limb. Based on these findings, which ONE of the following is the most likely diagnosis?

a. Chronic venous insufficiency
b. DVT
c. Heart failure
d. Lipoedema
e. Nephrotic syndrome

12.12. Which ONE of the following scenarios is most appropriate for antibiotics to be initiated in primary care for cellulitis?

a. Mild systemic upset with no comorbidities
b. Mild systemic upset with multiple comorbidities
c. No systemic symptoms but has poorly controlled diabetes
d. No systemic symptoms but has controlled diabetes
e. No systemic upset and has no comorbidities

12.13. A 78-year-old male presents with a 5-month history of nonpainful bilateral leg oedema. Which ONE of the following is the most likely diagnosis?

a. Cellulitis
b. DVT
c. Heart failure
d. Lipoedema
e. Lymphoedema

12.14. A number of risk factors are known in the development of DVT. Which ONE of the following is least associated as a risk factor?

a. Diabetes
b. Inactivity
c. Obesity
d. Older age
e. Smoking

12.15. Leg swelling can be acute or chronic and affect one or both legs. Which ONE of the following tends to be an acute presentation affecting one leg?

a. Cellulitis
b. Heart failure
c. Lipoedema
d. Lymphoedema
e. Venous insufficiency

12.16. Which ONE of the following can present with unintentional weight loss and an increased appetite?

a. An adverse drug reaction
b. Cancer
c. Depression
d. Hyperthyroidism
e. None of the above

12.17. People with unintentional weight loss and fever, fatigue and night sweats may have which ONE of the following disorders?

a. Addison disease
b. Cancer
c. Diabetes
d. Heart failure
e. Hyperthyroidism

12.18. Adverse drug reactions are known to cause anorexia or decreased appetite. Which ONE of the following is most likely to cause weight loss?

a. Bupropion
b. Digoxin
c. Exenatide
d. Levodopa
e. Zonisamide

12.19. Type 1 diabetes can present with a range of signs and symptoms. Which ONE of the following is least likely?

a. Blurred vision
b. Excessive thirst
c. Fatigue
d. Polyuria
e. Weight loss

12.20. In which ONE of the following would appetite be increased?

a. Adverse drug reactions
b. Anxiety
c. Cancer
d. Depression
e. Hyperthyroidism

Answers

12.1. Answer: e

Rationale: Options b to d are often used for rhinitis symptoms. NSAIDs (a) are used for pain and inflammation but are not effective in polyps.

12.2. Answer: a

Rationale: Unilateral bleeding is common with all options other than polyps (c), which tend to be bilateral. Tumour (e) is associated with older age groups and can be discounted. As discharge is also seen then foreign body (a) seems most likely compared with trauma (b) and septal deviation (d).

12.3. Answer: e

Rationale: Angiofibroma (a) and blood disorders (b) are rare causes of nosebleed. The association with bleeds and hypertension (d) is controversial. Blunt trauma (c) is a common cause, but having nosebleeds of no known cause (e) is the commonest presentation.

12.4. Answer: e

Rationale: Tumours (a and b), anatomic problems (c) and foreign bodies (d) are usually unilateral presentations.

12.5. Answer: e

Rationale: Dry nasal passages (b) is more of a risk facture than a condition. Hypertension (c) is a controversial cause of nosebleed. Angiofibroma (a) is a rare cause, and NSAID use (d) is uncommon.

12.6. Answer: c

Rationale: Knee pain is associated with osteoarthritis (e) in older people but is not associated with her other symptoms. Beta-blockers (d) can cause tiredness, but again, her other symptoms would not be consistent with medicine side effects. Hepatitis (b) can show tiredness and nausea, but knee pain would be inconsistent. Renal failure (a) can show nausea, loss of appetite and fatigue, but urinary symptoms should be present. Hyperparathyroidism (c) can exhibit all of the patient's symptoms.

12.7. Answer: a

Rationale: All present with tiredness, although hypothyroidism (b) and ME (c) are least associated with widespread joint pain. Osteoarthritis (d) tends not to cause joint swelling and is usually limited to a few joints. Rheumatoid arthritis (e) is plausible as the cause, but blood test results should be abnormal.

12.8. Answer: c

Rationale: Weight gain and facial changes associated with contraceptive (steroid) use is associated with Cushing syndrome.

12.9. Answer: a

Rationale: When medicines are indicated, antidepressants are often advocated, not options c through e. Acupuncture (b) does seem to have some benefit but seems to be short-lived. Exercise (a) and talking therapies are recommended as first-line approaches.

12.10. Answer: e

Rationale: All but aspirin can cause tiredness. Atorvastatin (d) is reported as uncommon. Atenolol (b) and ramipril (d) are common, but sertraline (e), like other SSRIs, is reported as very common.

12.11. Answer: b

Rationale: Chronic venous insufficiency (a), heart failure (c) and lipoedema (d) are chronic conditions. Nephrotic syndrome (e) is a problem seen in children. DVT (b) is an acute presentation.

12.12. Answer: e

Rationale: Patients with cellulitis should only be treated in primary care when there are no systemic symptoms in a patient who does not have comorbidities.

12.13. Answer: c

Rationale: Cellulitis (a) and DVT (b) are usually unilateral presentations; the other three are bilateral. Lipoedema (d) causes pain. Heart failure (c) and lymphoedema are painless, but the prevalence of heart failure coupled with the person's age suggests this is the more likely cause.

12.14. Answer: a

Rationale: There are many risk factors associated with DVT. Options b to e are known risk factors, and although some medical conditions are also risk factors (e.g., cancer, heart failure, IBD), diabetes is not known to contribute to DVT risk.

12.15. Answer: a

Rationale: Only cellulitis (a) is an acute presentation and is almost always unilateral.

12.16. Answer: d

Rationale: All options (a through d) could cause weight loss, but only hyperthyroidism (d) sees an increase in appetite.

12.17. Answer: b

Rationale: All show unintentional weight loss and fatigue. However, cancers, such as lymphomas, can present with fever and night sweats. These are not associated with the other options.

12.18. Answer: e

Rationale: All listed medicines are known to cause anorexia or decreased appetite. Levodopa (d) is not specified regarding the incidence. Digoxin (b) is listed as very rare. Bupropion (a) is uncommon. Exenatide (c) as common, but zonisamide (e) is known to very commonly cause anorexia.

12.19. Answer: a

Rationale: Although all options can be experienced, options b through e are classic and common undiagnosed diabetes symptoms.

12.20. Answer: e

Rationale: With options (b to d, a decreased appetite is more likely. Adverse drug reactions (a) have no effect on appetite.

Case studies

CASE STUDY 12.1

Mrs X asks for your advice about her 14-year-old daughter. She is concerned about her daughter's weight. She reports that her daughter is thin, and recent clothes purchases now appear large on her. She suspects her daughter has lost weight. Her daughter does not talk to her when she has asked if she is OK. The only thing her daughter has said is she likes to have her clothes baggy, which is why her mum thinks she has lost weight. Her daughter takes no medication from the doctor.

a. What would be your problem representation?

A healthy adolescent female, with suspected weight loss

b. What would be your working hypothesis regarding a diagnosis?

Given we are dealing with an adolescent female, we can initially rule out a number of possible causes of weight loss, such as peptic ulcer disease, Addison disease, alcoholism, COPD, infections, heart failure, medicines, Parkinson disease and thyrotoxicosis.

The most likely conditions we need to first consider are mental health and GI disorders and diabetes.

c. What questions could you ask her mother?

Asking about triggers for stress and asking screening questions for depression seem appropriate.

Her mum says she has typical teenage problems of exams and peer pressure but could not think of anything else.

d. What other questions could be asked?

Ask if she has started her periods and if she has what are they like; normal periods tend to point away from an eating disorder.

Ask if they have any excessive thirst or going to the toilet more. Positive answers point toward diabetes.

Ask if any recent bouts of diarrhoea. Positive answers suggest GI causes.

e. What do you think might be the problem?

- *GI causes seem to be unlikely.*
- *Mental health problems cannot be fully ruled out.*
- *She does exhibit some signs of classic type 1 diabetes. On this basis, the patient needs to be referred to a GP for fuller evaluation.*

Chapter 13

Specific product requests

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Background

Many patients present in the pharmacy requesting a specific product rather than wanting advice on symptoms. Regardless of the reason why they are asking for the product, it is the responsibility of the pharmacist to ensure that the patient receives the most appropriate therapy. This chapter therefore deals with situations in which patients ask for a particular product but when more information from the patient is needed before complying with their requests.

Nicotine replacement therapy

Background

Smoking represents the single greatest cause of preventable illness and premature death worldwide. In 2019, nearly 75 000 people in the United Kingdom died because of smoking.

Prevalence and epidemiology

The number of smokers older than the age of 18 years in the United Kingdom is decreasing—from a high of 45% in 1974 to 13% in 2022. Higher rates are seen in males (15%) than females (11%), and those aged 25 to 34 years had the highest level of smoking (16%); those aged 65 years had the lowest (8%). When looking at smoking prevalence by socioeconomic status, those working in routine and manual occupations are significantly more likely to smoke than those in managerial and professional occupations. Increases in e-cigarette usage are particularly evident in younger people (16–24 years), with 16% of this age group using them.

Aetiology

Hundreds of compounds have been identified in tobacco smoke; however, only three compounds are of real clinical importance:

- Tar-based products, which have carcinogenic properties
- Carbon monoxide, which reduces the oxygen-carrying capacity of the red blood cells
- Nicotine, which produces dependence by activation of dopaminergic systems

Tolerance to the effects of nicotine is rapid. When plasma nicotine levels decrease below a threshold, patients begin to have nicotine withdrawal symptoms and crave another cigarette. Treatment is therefore based on maintaining plasma nicotine just above this threshold.

Evidence base for over-the-counter medication

Nicotine replacement therapy (NRT) has established itself as an effective treatment. A 2018 Cochrane review (Hartmann-Boyce et al., 2018) found 136 trials (*n* >64 000) comparing NRT with placebo or non-NRT treatments, and the results indicated that NRT increases rates of quitting smoking by 50% to 60%. The review found that all forms of NRT are effective, and there are insufficient data to suggest that one form is superior to another. Therefore, personal choice is the determining factor in which is chosen as being most suitable.

The effectiveness of NRT is also affected by the level of additional support provided to the smoker. Numerous intervention strategies have been used involving NRT. These include nurse-led services, workplace interventions and doctor- and pharmacy-based services. A 2012 review reported good levels of evidence that community pharmacists can deliver effective smoking cessation programmes and that structured interventions and counselling were better than opportunistic intervention (Brown et al., 2012).

It should be noted that relapse is a normal part of the quitting process and occurs on average three to four times. If a smoker has made repeated attempts to stop and has failed, experienced severe withdrawal or has requested more intensive help, then referral to a specialist smoking cessation service should be considered.

Practical prescribing and product selection

Before instigation of any treatment, it is important that the patient does want to stop smoking. Work has shown that motivation is a major determinant for successful smoking cessation, and interventions based on the transtheoretical model of change put forward by Prochaska and colleagues have proved effective (Fig. 13.1). The model identifies six stages, progress through which is cyclical, and patients need varying types of support and advice at each stage.

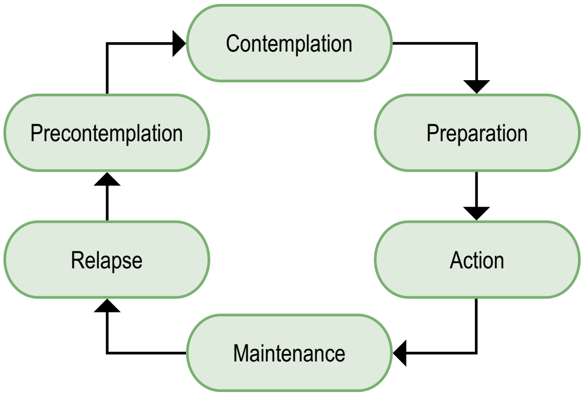

Fig. 13.1 The Prochaska and DiClemente stages of change model.

Most patients who ask directly for NRT are at the preparation stage of the model and are ready to enter the action stage. However, a small number of patients may well be buying NRT to please others and are in the precontemplation stage and do not want to stop smoking.

Nicotine replacement therapy products

NRT is formulated as gum, lozenges, patches, nasal sprays, inhalators, mouth sprays and sublingual tablets; therefore, there should be a treatment option to suit all patients. They are generally used to reduce smoking before quitting or to replace smoking completely via a cessation programme.

In general, one form of NRT is tried at a time, and the strength of the formulation is tailored to the number of cigarettes smoked. However, it is possible for patients to use more than one form of NRT together, and there is evidence that this produces better results in patients with a high level of dependence.

Products can be used from age 12 years onwards. Side effects are rare and are either normally limited to gastrointestinal (GI) problems associated with accidental ingestion of nicotine when chewing gum or local skin irritation and vivid dreams associated with patches. Headache, dizziness and fatigue can also be experienced. NRT appears to have no significant interactions with other medicines and can be used in pregnancy and breastfeeding.

Prescribing information relating to medicines for NRT reviewed in the section 'Evidence base for over-the-counter medication' is summarized in Table 13.1. 'Hints and tips' are given in Box 13.1.

Schedules under each product are given for cessation, not reduction. The aim of reduction regimens is to prolong the smoke-free period.

Nicorette

Nicorette is available as gum (2 and 4 mg), inhalation cartridge (15 mg), microtab (2 mg), nasal spray (10 mg/mL), patches (10, 15 and 25 mg), mouth spray (1 mg/spray) and lozenge (2 and 4 mg).

Gum

Nicorette gum is available as either fruit or mint flavours (unflavoured gum leaves a bitter taste in the mouth). The strength of gum used should depend on how many cigarettes are smoked each day. In general, if the patient smokes fewer than 20 cigarettes a day, then 2-mg gum should be used. If more than 20 cigarettes a day,

Table 13.1
Practical prescribing: Summary of medicines used as nicotine replacement therapy

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Nicorette	Older than 12 years	Gastrointestinal disturbances, headache, dizziness	None	Patients with heart disease and diabetes	OK
Nicotinell					
NiQuitin					

HINTS AND TIPS BOX 13.1: NICOTINE REPLACEMENT THERAPY

Application of patches	• Patches should be applied to nonhairy skin on the hip, chest or upper arm. The next patch should be placed on a different site to avoid skin irritation.
16- or 24-hour patches?	• A 16-hour patch is suitable for most patients; however, if a patient requires a cigarette within the first 20–30 minutes after waking, then a 24-hour patch should be given. • If sleep disturbances are experienced with the 24-hour patch, the patient can switch to a 16-hour patch or alternatively remove the 24-hour patch when they go to bed.
People with diabetes	• Blood sugar levels should be monitored more closely than usual when nicotine replacement therapy is started because carbohydrate metabolism can be affected.
Gum chewing technique: 'chew and rest' technique	• The gum should be chewed slowly until the taste becomes strong, it should then be rested between the cheek and gum until the taste fades. The gum can then be rechewed. Each piece of gum lasts approximately 30 minutes.

then 4-mg strength may be needed. A maximum of 15 pieces of gum can be chewed in any 24-hour period.

Inhalation cartridge

The inhalator can be particularly helpful to smokers who still believe they need to continue the hand-to-mouth movement. Each cartridge is inserted into the inhalator, and air is drawn into the mouth through the mouthpiece. A maximum of six cartridges can be used in 24 hours. Each cartridge can be used for approximately eight 5-minute sessions, with each cartridge lasting approximately 40 minutes of intense use.

The amount of nicotine from a puff is less than that from a cigarette. To compensate for this, it is necessary to inhale more often than when smoking a cigarette.

Microtabs (sublingual tablets)

The standard dosage is one tablet per hour in patients who smoke fewer than 20 cigarettes a day (doubled for heavy smokers). This can be increased to two tablets per hour if the patient fails to stop smoking with the one tablet per hour regimen or for those whose nicotine withdrawal symptoms remain so strong they believe they will relapse. Most patients require between 8 and 24 tablets a day, although the maximum is 40 tablets in 24 hours. Treatment should be stopped when daily consumption is down to one or two tablets a day.

Nasal spray

At the start of treatment, one spray should be put into each nostril twice an hour to treat cravings. The maximum daily limit is 64 sprays, equivalent to two sprays in each nostril every hour for 16 hours.

Patches

The patches are usually applied in the morning and removed at bedtime (a 16-hour patch). For smoking cessation, patients who smoke more than 10 cigarettes a day should start on the highest-strength patch (25 mg, known as step 1) for 8 weeks before stepping down to the middle strength (15 mg, step 2) for a further 2 weeks. Finally, the lowest-strength patch (10 mg, step 3) should be worn for another 2 weeks. Those who smoke less than 10 cigarettes are advised to start at step 2 for 8 weeks and then step 3 for a further 4 weeks.

Mouth spray

One or two sprays should be used when cravings emerge. If this first spray fails to control cravings, a second spray can be used. Most smokers require one to two sprays every 30 minutes to 1 hour. The maximum number of sprays in a 24-hour period is 64.

Lozenge

The 2 mg lozenge is used for those who smoke 20 cigarettes or less a day and the 4 mg lozenge for those smoking more than 20 cigarettes a day. Most smokers require 8 to 12 lozenges per day (maximum, 15 lozenges per day).

Nicotinell

Nicotinell is available as gum (2 or 4 mg), patch (7, 14 and 21 mg) and lozenge (1 and 2 mg).

Gum

Nicotinell gum is flavoured and available as fruit, mint or liquorice. The strength of gum used will depend on how many cigarettes are smoked each day. In general, if the patient smokes fewer than 20 cigarettes a day, then the 2-mg gum should be used. If more than 20 cigarettes a day, then the 4-mg strength may be needed. A maximum of 24 pieces a day can be chewed, but normally people will only need between 8 and 12 pieces.

Patches

The patches are worn continuously and changed every 24 hours, so Nicotinell patches are suitable for smokers who must have a cigarette as soon as they wake up because nicotine levels will be above the threshold of nicotine withdrawal.

Treatment, like Nicorette, is based on a stepwise reduction over a period of 3 months. People who smoke more than 20 cigarettes a day should use the highest-strength patch (TTS 30 patch, 21 mg) for 3 to 4 weeks, after which the strength of the patch should be reduced to the middle strength (TTS 20 patch, 14 mg) for a further 3 to 4 weeks before finally using the lowest-strength patch (TTS 10 patch, 7 mg). If the patient smokes fewer than 20 cigarettes a day, then they should start on the middle-strength patch.

Lozenge

For those smoking fewer than 20 cigarettes a day the 1-mg lozenge should be used, and for those smoking 30 or more cigarettes a day, the 2-mg strength is recommended. For those smoking between 20 and 30 cigarettes a day, 1-or 2 mg lozenges can be used depending on patient response. Patients should be instructed to suck one lozenge every 1 to 2 hours when they have the urge to smoke. The usual dosage is 8 to 12 lozenges per day, with a maximum of 30 lozenges in 24 hours. Patients should be advised to gradually reduce the number of lozenges needed until they are only using one to two lozenges per day. At this point, they should stop treatment.

Lozenges are mint flavoured and should be sucked until the taste becomes strong and then placed between gum and cheek (similar to the gum) until the taste fades, when sucking can recommence. Each lozenge takes approximately 30 minutes to dissolve completely.

NiQuitin

NiQuitin is available as gum (2 or 4 mg), patches (7, 14 and 21 mg) and lozenge (2 and 4 mg, or NiQuitin minis: 1.5 and 4 mg).

Gum

The lower 2-mg strength is aimed at smokers who have their first cigarette of the day more than 30 minutes after waking up and the higher 4 mg strength for those who smoke within 30 minutes of awakening. The 'chew and rest' technique, as with Nicorette and Nicotinell, is used. For either strength, between 8 and 12 pieces of gum per day (up to a maximum of 15 per day) can be chewed and no longer used once only using one or two pieces of gum per day.

Patches

Like Nicotinell, patches are designed to be worn continuously (24-hour patch), and dosing is based on a sequential reduction of nicotine over time. Patients who smoke more than 10 cigarettes a day should use the 21-mg patch (step 1) for 6 weeks followed by the 14-mg patch (step 2) for 2 weeks and finally the 7-mg patch (step 3) for the last 2 weeks. If the person smokes fewer than 10 cigarettes each day, the patient should start on step 2 for 6 weeks followed by step 3 for a final 2 weeks.

Lozenges

The low-strength lozenge (2 mg) is aimed at smokers who have their first cigarette of the day more than 30 minutes after waking up and the higher strength (4 mg) for those who smoke within 30 minutes of awakening. Like patches the dose of lozenges are marketed as steps:

- Step 1 for 6 weeks. Take one lozenge every 1 to 2 hours
- Step 2 for 3 weeks. Take one lozenge every 2 to 4 hours.
- Step 3 for 3 weeks. Take one lozenge every 4 to 8 hours.

After this programme, patients can use one to two lozenges a day over the next 12 weeks when tempted to smoke.

NiQuitin Minis lozenge

Dosing of this version of the lozenge does vary from NiQuitin lozenges. The low-strength (1.5 mg) lozenge is marketed for people who smoke fewer than 20 cigarettes a day and the high strength (4 mg) for those who smoke more than 20 cigarettes a day. It is recommended in either strength that the person should use between 8 and 12 lozenges per day (up to a maximum of 15 per day) and stop altogether when only using one or two lozenges per day.

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Malaria prophylaxis

Background

Malaria is a parasitic disease spread by the female *Anopheles* mosquito. Five species of the protozoan *Plasmodium* produce malaria in humans: *Plasmodium vivax, Plasmodium ovale, Plasmodium malariae, Plasmodium knowlesi* and *Plasmodium falciparum. P. falciparum* is the most virulent form of malaria and is responsible for most cases and associated deaths.

Prevalence and epidemiology

Malaria is a leading cause of death in areas of the world where the infection is endemic. Deaths decreased between 2000 (897 000 deaths) and 2015 (577 000 deaths), but subsequently, there has been a slow but steady increase. In 2021, 619 000 people died from malaria, with the World Health Organization African region accounting for 96% of all malaria deaths. This is partially attributable to the COVID-19 pandemic. Four countries accounted for just over half of all malaria deaths globally: Nigeria (31.3%), the Democratic Republic of the Congo (12.6%), the United Republic of Tanzania (4.1%) and the Niger (3.9%).

In the United Kingdom, there are between 1000 and 2000 imported cases each year, resulting in, on average, six deaths per year. In 2021 there were 1012 cases; *P. falciparum* accounted for 86% of cases, *P. vivax* 5%, *P. ovale* 7% and just 3% for *P. malariae.* Among people with malaria who travelled abroad from the United Kingdom in whom the history of chemoprophylaxis was known, 89% had not taken chemoprophylaxis.

Aetiology

Malarial parasites are transmitted to humans when an infected female *Anopheles* mosquito bites its host. In the human host, the parasites (which at this stage of their lifecycle are known as sporozoites) are transported via the bloodstream to the liver. In the liver, they divide and multiply (they are now known as merozoites). After 5 to 16 days, the liver cells rupture to release up to 400 000 merozoites, which invade the human host's erythrocytes. The merozoites reproduce asexually in the erythrocytes before causing them to rupture and release yet more merozoites into the bloodstream to invade yet more erythrocytes. Any mosquito that bites an infected person at this stage will ingest the parasites, and the cycle will begin again.

Clinical signs and symptoms are observed when parasites are in the blood stage and not whilst the parasites are developing in the liver. This explains why malarial symptoms can manifest months after return from an infected region because the parasite (especially *P. vivax* and *P. ovale*) can remain dormant in the liver.

Clinical features of malaria

The most common symptom is fever, although it may initially present with chills, general malaise, nausea, vomiting and headache. Malaria should be considered in anyone who presents with a febrile illness while in or having recently left an area endemic for malaria. *P. falciparum* is unlikely to present more than 3 months after exposure, but symptoms associated with *P. vivax* malaria can take up to 1 year to manifest.

Evidence base for over-the-counter medication

Effective bite prevention should be the first line of defence against malarial infection. Total avoidance of being bitten is not practical, and patients should take additional protective measures from being bitten.

Insect repellents

Insect repellents containing N,N-diethyl-m-toluamide (DEET) especially in high concentrations have proven effectiveness at reducing the number of mosquito bites (Nguyen et al., 2023) but whether this leads to DEET preventing malaria is debatable (Gabaldón Figueira et al., 2023; Maia et al., 2018).

General measures to reduce being bitten

Besides applying DEET, other preventive measures to reduce the chance of being bitten include wearing long, loose-fitting, sleeved shirts and trousers, especially at dawn and dusk. Protection of the ankles appears to be particularly important. Hotel windows should be checked to make sure they have adequate screening; windows and doors should remain closed; and ideally, the bed should have a mosquito net. Mosquito nets do reduce the incidence of being bitten. Ideally, they should be impregnated with insecticide because these are more effective than nonimpregnated nets (Price et al., 2018). If the person is travelling to more remote areas, they should purchase their own mosquito net that has been impregnated with an insecticide. There are a number of travel centres and specialty outdoor shops where such products, including insecticidal impregnated clothes, can be bought.

Chemoprophylaxis

Chloroquine and proguanil have long been available over the counter (OTC) in the United Kingdom, and in 2017, atovaquone was deregulated in combination with proguanil (Maloff Protect). Unfortunately, resistance to chloroquine and proguanil is now widespread and limits their usefulness, and in July 2023, proguanil and proguanil–chloroquine combinations were discontinued.

Practical prescribing and product selection

Prescribing information relating to medicines for malaria reviewed in the section 'Evidence base for over-the-counter medication' is discussed and summarized in Table 13.2; useful tips relating to

Table 13.2
Practical prescribing: Summary of medicines for malaria prophylaxis

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Chloroquine	All ages	Gastrointestinal and visual disturbances[a]	Amiodarone, ciclosporin, cimetidine, digoxin	Avoid in epilepsy	OK, but manufacturers of Maloff advise against its use.
Maloff		Very common: headache, nausea, vomiting, diarrhoea, abdominal pain Common: anaemia, allergic reactions, anorexia, abnormal dreams, depression, insomnia, dizziness, pruritus, rash, fever, cough	Etoposide, rifampicin, warfarin, metoclopramide, tetracycline, indinavir, efavirenz, zidovudine	Renal impairment	

[a] Incidence unknown.

HINTS AND TIPS BOX 13.2: MALARIA

Assessing risk for travellers

- For people travelling to countries where malaria is present, the risk of contracting malaria varies greatly. It depends on the area visited, the time of year, the altitude (parasite maturation cannot take place above 2000 m) and how many infectious bites are received. In general, risk tends to increase in more remote areas than in urban or tourist areas, after rainy or monsoon seasons and at low altitude. It is therefore possible to have a different risk of contracting malaria within the same country; for example, visiting the southern lowlands of Ethiopia after the rainy season would pose a very high risk, whereas trekking in the Simien mountains in the north of the country during the dry season would pose minimal risk.
- It is important to check current guidelines for the destination the person is travelling to or through. Two easily available UK reference sources in which recommendations can be found are the British National Formulary and MIMS (subscription required). For people who are travelling to very-high-risk areas (usually sub-Saharan Africa) or for long periods of time, it might be better to refer the person to a specialist centre (see listed websites).

Application of DEET

- The concentration of DEET in commercial products varies widely. Products with concentrations >50% can cause skin irritation and occasionally skin blistering. It is advisable that these are patch tested first before widespread application.
- The higher the concentration of DEET, the greater the length of protection:
  - 50% DEET provides protection for up to 12 hours.
  - 30% DEET provides protection for up to 6 hours.
  - 20% DEET provides protection for 1–3 hours.
- 50% therefore should be recommended.
- Reapplication is necessary after swimming or sweating.
- DEET can damage certain plastics (e.g., sunglasses). It is important to emphasize to the patient that they wash their hands after applying DEET.
- Make sure exposed areas, such as feet and ankles, are adequately protected.
- DEET reduces the effectiveness of sunblock, but sunblock does not affect the effectiveness of DEET. Therefore, always apply DEET after sunscreen.

Electronic mosquito repellents

- These products are designed to repel female mosquitoes by emitting high-pitched sounds that are almost inaudible to human ears. There is no evidence in field studies to support any repelling effects.

Alternative remedies to reduce being bitten

- There is currently insufficient evidence supporting the use of vitamin B_1, garlic, tea tree oil, herbal remedies, Marmite or repellents containing lemon eucalyptus (e.g., Mosi-guard). They should not be routinely recommended.

Medicine regimens

Chloroquine

- Start 1 week before exposure to risk and continue until 4 weeks after leaving the malaria-endemic area.

Maloff

- Commence 1 to 2 days before entering a malaria-endemic area, continue during the period of the stay and continue for 7 days after leaving the area.

patients travelling to regions where malaria is endemic are given in the ‘Hints and tips’ in Box 13.2.

Medicine regimens

Antimalarials need to be taken before departure, during the stay in the malaria endemic region and after leaving the area. Taking the medication before departure allows the patient to know whether they are going to experience side effects, and if they do, to have enough time to obtain a different antimalarial agent before departure. It also helps to establish a medicine-taking routine that will, hopefully, help with adherence. Medicine taking after leaving an endemic area is to ensure that any possible infection that could have been contracted during the final days of the stay does not develop into malaria.

Chloroquine (e.g., Avloclor)

Chloroquine, as a single agent, is now almost obsolete against *P. falciparum* but remains effective against the other forms of malaria. Adults should take 300 mg of chloroquine base each week; this is equivalent to two tablets. For children ideal dosing is 5 mg of chloroquine base/kg per week, but practically, this equates to half a tablet for children aged 1 to 4 years old; one tablet for those aged 5 to 8 years old and children 9 to 14 years old should take 1.5 tablets.

Chloroquine is associated with a number of side effects, including nausea, vomiting, headaches and visual disturbances, although their exact incidence is unknown. Most patient groups, including pregnant and breastfeeding females, can take chloroquine, although it might lower the seizure threshold in epilepsy and tonic–clonic seizures have been reported with prophylactic doses. Patients with psoriasis might notice a worsening of their condition.

Chloroquine should be avoided in patients taking amiodarone because there is a risk of QT prolongation and ventricular arrhythmia. It should also be avoided with ciclosporin (increased ciclosporin levels), cimetidine (increased chloroquine levels) and possibly digoxin (increased digoxin levels).

Atovaquone–proguanil (Maloff Protect)

Each Maloff Protect tablet contains 250 mg of atovaquone and 100 mg of proguanil hydrochloride. The dosage (for adults only) is one tablet daily taken with food or a milky drink. It has a number of license restrictions, including any person with liver or renal impairment, those with a history of depression and seizures, patients with tuberculosis and during pregnancy or breastfeeding. Interactions of note include etoposide, rifampicin, warfarin, metoclopramide, tetracycline, indinavir, efavirenz and zidovudine. Side effects are wide ranging, but those reported as very common are headache, nausea, vomiting, diarrhoea and abdominal pain.

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Weight loss

Background

Obesity is a growing epidemic, particularly in developed countries. Consequently, the risk of diseases such as diabetes and cardiovascular disease are also increasing, resulting in a situation in which the current and future generations could have a shorter life span than their parents. Although a number of measures for obesity have been proposed, the internationally accepted measure is the body mass index (BMI). This is calculated as weight in kilograms divided by height squared. A BMI of over 25 kg/m^2 is classified as overweight, and for obesity, the value is 30 kg/m^2.

Prevalence and epidemiology

In 2022, reported figures show that around two-thirds (64%) of adults are above a healthy weight, and of them, half are living with obesity. In England, one in three children leaving primary school are overweight or living with obesity. Obesity prevalence is highest amongst the most deprived groups in society.

Aetiology

Although a number of causes of obesity have been proposed and genetics may play an important role, for a significant proportion of the population, it results from an imbalance between energy intake (food and beverages) and energy expenditure (exercise). Other factors associated with obesity include cultural norms, socioeconomic status, gender and ethnicity. In addition, certain medical conditions (e.g., hypothyroidism) and medicines (e.g., corticosteroids, beta-blockers, anticonvulsants) can cause weight gain.

Evidence base for over-the-counter medication

Orlistat

Orlistat inhibits pancreatic and gastric lipase, which reduces the absorption of fat from the gut. There is a significant body of evidence demonstrating the benefits of modest weight loss (~5–10% of initial body weight) and lifestyle modification, ranging from lipid profile modification to reduction in blood pressure. Clinical trials have shown that orlistat can produce these modest levels of weight loss (Hill et al., 1999). A 2014 systematic review and meta-analysis identified five trials that used orlistat at the approved dose (120 mg three times a day) and found the average weight loss after 12 months was 2.34 kg (Dombrowski et al., 2014). The best results with orlistat are seen in the short term (6–12 months); long-term results rely heavily on lifestyle changes; see the 'Hints and tips' in Box 13.3.

Practical prescribing and product selection

Orlistat (Alli)

Orlistat is indicated for weight loss in adults older than 18 years old who are overweight (BMI ≥28 kg/m^2). The dosage is one 60-mg

HINTS AND TIPS BOX 13.3: WEIGHT LOSS

Realistic weight loss goals	- Recommended goals are 1–4 kg/month in the short term and 10–20% of body weight in the medium to long terms.
Exercise	- People should be encouraged to start with regular, moderate exercise (e.g., brisk walking) three times a week, with the aim of increasing exercise to a minimum of 80 minutes/day to maintain weight loss.

capsule three times daily. The capsules should be taken immediately before, during or up to 1 hour after each main meal. If a meal is missed or contains no fat, the dose of orlistat should not be taken. Taking orlistat should be in conjunction with a mildly hypocaloric, lower-fat diet. If weight loss has not been achieved after 12 weeks, then the patient should stop taking orlistat.

Very common or common side effects relate to GI disturbances such as faecal urgency and incontinence, oily evacuation and spotting, flatus and abdominal pain. These can be minimized by restricting fat intake to less than 20 g per meal. Orlistat may impair the absorption of fat-soluble vitamins (A, D, E and K), and for this reason, a multivitamin supplement should be taken. Because of the effect on vitamin K levels, patients taking warfarin should avoid using orlistat. Orlistat may decrease ciclosporin levels and requires monitoring. There are limited data of orlistat being used in pregnancy and breastfeeding, and it is therefore not recommended.

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Erectile dysfunction

Background

Sildenafil (deregulated in November 2017) and tadalafil (deregulated in 2023) are both available over the counter. Both are potent and selective, reversible inhibitors of cyclic guanosine monophosphate (cGMP)–specific phosphodiesterase type 5 in the corpus cavernosum, which enhances the relaxant effect of nitric oxide, allowing inflow of blood. For an erection to occur, sexual stimulation is required.

Prevalence and epidemiology

Erectile dysfunction (ED) is a common disorder. It can occur at any age, with studies involving males older than the age of 40 years reporting rates between 19% and 50%. This is likely to be an underestimate because of underreporting to healthcare professionals. The prevalence increases with increasing age and is attributable to chronic disease, comorbid conditions and age-related changes.

Aetiology

ED is attributed to various causes, including those that are organic in origin, which may be vascular (e.g., cardiovascular disease), neuronal (e.g., degenerative disorders, neuropathy), hormonal (e.g., thyroid dysfunction), anatomic or metabolic (e.g., diabetes). It can also be psychological, ranging from depression to performance anxiety.

Condition to eliminate

Medicine induced

Many medicines are associated with causing ED. Table 13.3 highlights those most implicated.

Evidence base for over-the-counter medication

Trial data for both products compared with placebo have shown clinically and statistically significant improvements in causing penile erection.

Practical prescribing and product selection

Because both have the same mechanism of action, they have very similar cautions, contraindications, drug interactions and side

Table 13.3
Medicines known to cause erectile dysfunction

Cardiovascular	- Beta-blockers, verapamil, methyldopa, clonidine, diuretics (e.g., spironolactone and thiazides), digoxin, amiodarone
Psychotropic	- Anti-depressants, e.g., selective serotonin reuptake inhibitors, tricyclics, monoamine oxidase inhibitors, lithium, chlorpromazine, haloperidol
Antiepileptics	- Carbamazepine, phenytoin, barbiturates
Endocrine	- Hormones and hormone-modifying drugs: antiandrogens (flutamide, cyproterone acetate), luteinizing hormone releasing hormone agonists (leuprorelin, goserelin), corticosteroids
Others	- 5-Alpha reductase inhibitors (e.g., finasteride), H_2 antagonists, recreational drugs

Table 13.4

Practical prescribing: Summary of medicines for erectile dysfunction

Name of medicine	Use in children	Very common (≥1/10) or common (≥1/100) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy and breastfeeding
Sildenafil	Not applicable	Headache, dizziness, flushing, nausea, dyspepsia, nasal congestion, visual disturbances	Nitrates, alpha blockers, CYP3A4 inhibitors/ inducers	Cardiovascular problems	Not applicable
Tadalafil		Headache, flushing, nasal congestion, dyspepsia, back pain			

effects. The main consideration is assessing people for cardiovascular disease or who are in poor physical health (i.e., males who with light or moderate physical activity, e.g., walking briskly for 20 minutes or climbing two flights of stairs, feel very breathless or experience chest pain). Such patients should not take these products. Because they are metabolized by CYP3A4, medicines that inhibit (e.g., ketoconazole, ritonavir, macrolide antibiotics) or induce (rifampicin) should ideally be avoided. Coadministration of nitrates and alpha-blockers increases their hypotensive effect and again should be avoided. Common side effects associated with both products include headache, flushing, dyspepsia and nasal congestion.

Sildenafil (Viagra Connect)

Males older than the age of 18 years should take one tablet with or after food approximately 1 hour before sexual activity. If a patient needs to take it a number of times on different occasions before achieving a satisfactory penile erection for sexual activity, they should be advised to see a doctor.

Tadalafil (Cialis Together)

Males older than 18 years of age should take one tablet with or after food at least 30 minutes before sexual activity. Most males achieve an erection on the first or second time of use. Like sildenafil, if a patient needs to take it several times on different occasions before achieving a satisfactory erection, they should be advised to see a doctor.

Table 13.4 summarizes prescribing information for sildenafil and tadalafil.

Self-assessment questions

The following questions are intended to supplement the text. Two levels of questions are provided, multiple-choice questions and case studies. The Multiple-choice questions are designed to test knowledge and application of knowledge, and the case studies allow this knowledge to be put in context in patient scenarios.

Multiple-choice questions

13.1. Which ONE of the following species of plasmodium is associated with most malarial deaths?

- **a.** *P. falciparum*
- **b.** *P. knowlesi*
- **c.** *P. malariae*
- **d.** *P. ovale*
- **e.** *P. vivax*

13.2. Which 'stage of change' do patients ideally need to demonstrate before starting NRT?

- **a.** Action
- **b.** Contemplation
- **c.** Maintenance
- **d.** Precontemplation
- **e.** Preparation

13.3. Miss ZB, 29 years old, comes into your pharmacy wanting to buy Alli (orlistat 60-mg capsules) OTC. She has a BMI of 35 and a very sedentary lifestyle and takes no exercise. Her diet consists mostly of takeaways, but she tells you that she is keen to lose weight for her holiday in 6 months. Which one of the statements is correct regarding the sale of Alli?

- **a.** Alli can be sold to any individuals with BMI over 25 kg/m^2.
- **b.** Before starting Alli, the patient should have a diet and exercise programme in place.
- **c.** The maximum dose of Alli in 24 hours is 120 mg.
- **d.** The minimum age Alli can be purchased is 16 years.
- **e.** Treatment with Alli should not exceed 9 months.

13.4. Which is the most common side effect associated with sildenafil?

- **a.** Dizziness
- **b.** Dyspepsia
- **c.** Flushing
- **d.** Headache
- **e.** Nasal congestion

13.5. What is the recommended dosage for OTC sildenafil in a 70-year-old male with mild renal impairment?

- **a.** 25 mg od
- **b.** 25 mg bd
- **c.** 50 mg od
- **d.** 50 mg bd
- **e.** Not advised

13.6. Which is the most common side effect associated with MaloffProtect?

- **a.** Cough
- **b.** Dizziness
- **c.** Fever
- **d.** Headache
- **e.** Rash

Questions 13.7 to 13.10 concern the following medicines:

- **A.** Chloroquine
- **B.** NRT
- **C.** Levonorgestrel
- **D.** Sildenafil
- **E.** Orlistat

Select, from A to E, which of the above medicines:

13.7. Should be avoided in epilepsy?

13.8. Should be avoided in patients taking nitrates?

13.9. Affects absorption of vitamin A

13.10. May worsen psoriasis

Answers

13.1. Answer: a

Rationale: Most deaths are seen from sub-Saharan Africa, where P. falciparum *is most prevalent and therefore the species associated with most deaths.*

13.2. Answer: e

Rationale: Precontemplation (d) is when the person is not thinking seriously about making a change. Contemplation (b) is when the person is thinking about change. Action (a) is the person is determined what they are going to do and sets themselves 'goals'. Maintenance (c) is the goal of change.

13.3. Answer: b

Rationale: Treatment with Alli is to individuals with BMIs over 28 kg/m^2*, not 25 kg/m*^{2} *(a). The maximum dose is 180 mg, not 120 mg (c). the minimum age is 18 years, not 16 years (d). Treatment should not exceed 6 months, not 9 months (e).*

13.4. Answer: d

Rationale: All listed side effects are reported, although only headache recorded as occurring very commonly; all others are 'common'.

13.5. Answer: c

Rationale: No dose adjustments needed in this older male patient with mild renal disease, so the standard dose can be given.

13.6. Answer: d

Rationale: Cough (a), dizziness (b), fever (c) and rash (e) are listed as common, whereas headache (d) is very common.

13.7. Answer: a

Rationale: All OTC medicines have associated risk in use, whether this is their side effect or interaction profiles or use in certain patient groups. Vigilance should always be exercised when dealing with requests from patients with conditions that are treated with higher-risk medicines. Such a condition is epilepsy because the medicines used tend to have many side effects and have the ability to interact with multiple other medicines. Chloroquine may lower the convulsive threshold and thus antagonize the actions of antiepileptics and lead to loss of seizure control.

13.8. Answer: f

Rationale: Consistent with its known effects on the nitric oxide–cGMP pathway sildenafil potentiates the hypotensive effects of nitrates.

13.9. Answer: h

Rationale: Because orlistat works by inhibiting GI lipases, the body is unavailable to hydrolyse dietary fat, which may also potentially impair the absorption of fat-soluble vitamins.

13.10. Answer: a

Rationale: Many adverse events are not predictable and are only observed after repeated use in clinical practice; the precipitation of worsening psoriasis with chloroquine is such an example.

Case studies

CASE STUDY 13.1

Mr Heaney asks the counter assistant for advice on stopping smoking. The counter assistant refers him to the pharmacist.

a. Outline what factors should be considered to determine whether Mr Heaney is a suitable candidate to be given a smoking-cessation product.

Before instigation of any treatment, it is important that the patient does want to stop smoking. Studies have shown that motivation is a major determinant for successful smoking cessation, and interventions based on the transtheoretical model of change put forward by Prochaska and colleagues have proved effective. Most patients who ask directly for NRT are at the preparation stage of the model and are ready to enter the action stage.

Mr Heaney smokes 20 cigarettes a day and craves a cigarette when he gets up in the morning.

b. Outline the treatment option(s) that will be most suitable for Mr Heaney.

A 24-hour patch might be the formulation of choice for Mr Heaney to combat early-morning cravings. Alternatively, he could use a 16-hour patch and then use a short-acting type of NRT first thing in the morning to get over any cravings (e.g., inhalator).

c. What general advice will you give Mr Heaney in addition to any NRT product supplied?

Set a quit date; remove temptations; avoid environments where smoking happens. Promote healthy lifestyle advice that includes exercise, diet, weight control and avoiding alcohol.

You supply him with 1 week's worth of NRT and make an appointment for him to see you for further supply. On his return, you use a carbon monoxide (CO) monitor to check his adherence.

d. Outline the principles behind CO monitoring.

The best cut-off breath CO level for the determination of smoking status is 5 ppm because it gives the best sensitivity and specificity. Because there is a clustering of CO levels in individuals who smoked within the past 5 hours, this cut-off level may be a useful adjunct in detecting smoking status in individuals who have smoked within the past 5 hours. However, it is lower than the usual 6 to 10 ppm, as recommended by some studies. A cut-off breath CO level of greater than 8 ppm is strongly associated with self-reports on smoking. Charts produced by CO monitor manufacturers are useful visual aids to show acceptable levels (see http://www.camquit.nhs.uk/uploads/Carbon%20Monoxide%20Chart.pdf).

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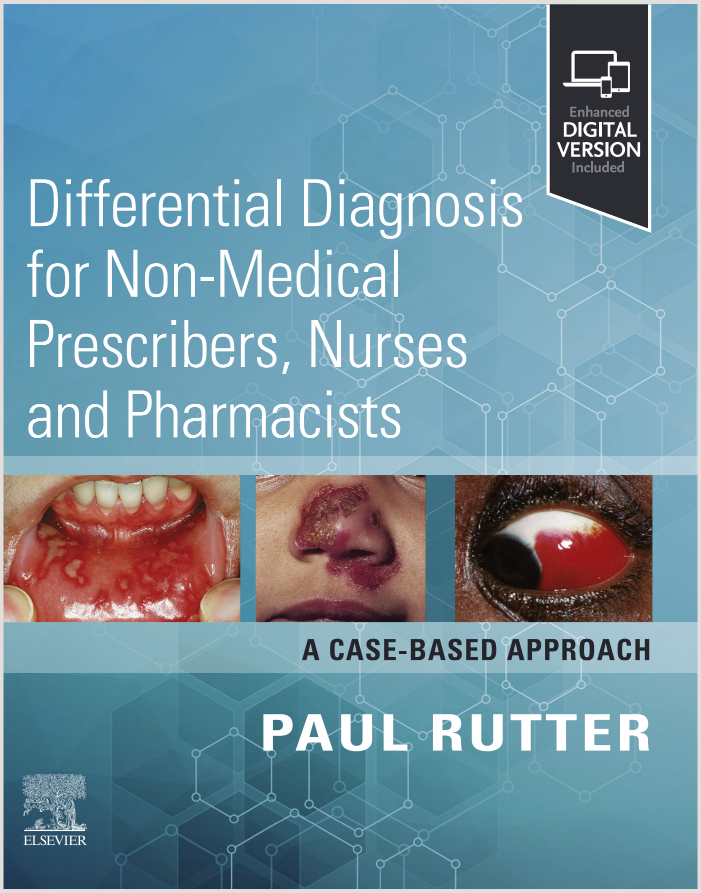

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